T, A consoant, and the nineteenth letter in the alphabet; the sound of which is formed by a strong expulion of the breath through the mouth, upon a sudden drawing back of the tongue from the fore part of the palate, with the lips at the same time open.

The T, at the beginning and end of words, has always the same sound, nearly resembling that of D, for which reason they are often put for each other; and Quintilian even allows those who made any scruple of writing the one indifferently for the other: as at for ad, fit for fed, haut for baud, &c.

The customary sound of T is that which occurs in the words take, temptation; but before an i, when followed by a vowel, it has the sound of an obscure s, as nation, salvation, except when s precedes t, as Christian; and in derivatives from s, as mighty, mightier.

The T is one of the five consoants which the abbot de Dangeau calls palatal: these five are D, T, S, K, and N; the four first of which have the same relation to each other, as the labials B-P and V-F have; D, for instance, having the same relation to T, that B has to P, and V to F.

The T, the same author observes, is a letter of a strong sound; so that a feeble one cannot be heard before it. Hence, to form the supine of rege, the T of tum changes the g, and strengthens it to the sound of a c, so that we say rectum; as in the proper perfect tense recti, which we pronounce receive.

T has two sounds: the one soft, as thus; the other hard, as thing. The sound is soft in these words, then, hence, there, with their derivatives and compounds, that, these, &c.; and in all words between two vowels, as father; and between r and a vowel, as burthen. In other words it is hard, as thick, thunder. Where it is softened at the end of a word, an e silent must be added, as breathe, breath. Johnson.

Vol. XXXV.

T is used as an abbreviation on ancient monuments, &c. for Titus, Titius, and Tullius.

T, among the Ancientst, was used as a numeral letter, signifying 160, according to the verse,

"T quoque centenos & sexaginta tenebit."

When a dash was at the top, thus, T, it signified 160 thousand.

T, with a kind of acute accent over it, denoted among the Greeks 300; and if the accent was below it, thus T, it denoted 300,000. The Û of the Hebrews signified 9; and with two points fixed horizontally over it, thus, Û, it signified 9000.

Sometimes an acute accent over this, or any one of the first nine letters, multiplies its value by a thousand.

We shall here observe, that the number 15 should be represented by Û, i.e. 10 and 5; but, because these letters constitute part of the word Ûûû, Jehovah, the letters Û, i.e. 9 and 6, represent 15, to prevent, as the Jews allege, the profanation of the peculiar name of God. For the same reason, Û, i.e. 9 and 7, are used instead of Û, i.e. 10 and 6, to express 16.

T, on the French coins, denotes those that were struck at Nantes.

When the Roman tribunes approved of the decrees of the senate, they testified their consent by subscripting a T.

T, in Mufic, is the initial of tenor, vocal and instrumental; of tact, for silence; as adagio tact, when a performer is to rest during the whole movement. In concerto's and symphonies, t is the initial of tutti, the whole band, after a solo part. It also frequently stands for trillo, or a shake.

T is also a mark or brand, with which by flat. 4 Hen. VII. every person convicted of felony, fave murder, and admitted
to the benefit of the clergy, shall be marked on the brawn of the left thumb.

T, or Tau, in Heraldry, is a kind of cows-potent, or truncated; found in all the armories of the commanders of the order of St. Anthony.

The azure T, or Tau, is seen in arms above 400 years old. Its origin, according to some authors, is taken from the Apocalypse; where the fame is a mark that the angel impreses on the foreheads of the elect: others take it to represent a crutch, a symbol proper enough for this order, which was sworn to hospitality. But the truth, F. Menefier observs, is, that it is the top of a Greek crofier.

The bips and abbots of the Greek church wear it still; and if it be found on the habit of St. Anthony, it is only to shew that he was an abbot.

T Bandage, in Surgery, is fo called from its resembing that letter in shape. It consists of two bands of linen, of greater or leffer breadth, according to circumstances. The tranverse piece of the bandage serves to roound the body above the hips. The perpendicular portion is fewed at one of its ends to the middle and back point of the band, which surrounds the pelvis; and its other or anterior extremity is generally fit into two portions, or tails, about fix or eight inches in length. The perpendicular piece of the T bandage applies itself between the glutæi mufcles and to the perineum; while the two tails, which we have just now described, are carried between the thighs and the pudenda to the right and left, and are lafiely fastened to the tranverse piece, which surrounds the body. The T bandage is chiefly employed for keeping on the dressings, after the operation for the fistula in ano, in difeases of the perineum, and in those of the anus, groins, &c.

Besides the common T bandage, surgeons make ufe of another, which they call double, and which is furnished with two perpendicular pieces, fewed to the tranverse one, about four inches apart. The double T bandage is represented to be particularly calculated for cafes of lithotomy, and for difeases of the perineum; because the two perpendicular bands may be made to eif the other on the part affected, and leave the anus uncovered; an advantage which the single T bandage certainly has not.

The T bandage admits of application also in other modes. When the eif band is broad, it may be applied round the cheft, while the perpendicular portion, being fit into two, may be made to pass over the shoulders, fo as to keep the bandage from flipping downward. There is no kind of bandage which can be more conveniently applied to the cheft, than that which has just now been described. See Bandage.

TA, in Geography, a fortified city of China, of the second rank, in the province of Szechew; 650 miles S.W. of Pekin. N. lat. 31° 18' E. long. 107° 15'.—Allo, a river of China, which runs into the East sea, N. lat. 36° 55' E. long. 121° 34'.

TA, Lough, a lake of the county of Wexford, Ireland, not far from Carnforth Point. It receives two or three smart rivulets, and having no outlet, the waters accumulate, and gradually overflow the adjacent grounds; till the peafantry, once in three or four years, let them off, by making a cut through the high land-bank that parts the lake from the sea; which cut very soon fills up again.

TA, a name given in China to their pagodas. There are numerous in hilly parts of the country, upon the summits of which they are frequently erected. They are generally from 120 to 160 feet high, which height is equal to four or five of their diameters at the base; and they conftit mostly of an unequality number, five, seven, or nine galleries or stories, diminishing as they rife, with as many projecting roofs.

TA, τα, one of the four syllabes used by the ancient Greeks in fomiuation, or the first lefson in finging.

TAAIF, in Geography, a town of Arabia, in the province of Hecitas, situated upon a lofty mountain, in a country fo agreeable, that the Arabs compare its environs to thole of Damacus and Sana. This city supplies Jidda and Mecca with excellent fruits, particularly grapes; and carries on a considerable trade in almonds, which abound in its territories. Near Taaif is the lofty mountain of Gazwan, which, according to Arabian authors, is covered with frost and snow in the midft of summer.

TAAMBOOTERA, a large town of the Birman empire, on the Irawaddy.

TAAPAN, a town on the coast of Mindanao. N. lat. 7° 38'. E. long. 124° 5'.

TAAS, or TAAS, a city of Arabia, in the province of Yemen, situated at the foot of the fertile hill of Sabber, and encompassed with a wall, between 16 and 30 feet thick, and flanked with several towers. Within the circuit of the wall, stands the fortress of Kahre. The city has only two gates, each fortified with three towers; affording a very infufficient defence against any affault but that of Arabs, unskilled in the use of artillery. The faint who is the patron of Taas is the famous Ismael Mulk, reported by tradition to have been once king of this country. His remains are interred in a mosque bearing his name. Near this mosque is a garden, which was poiffeled by Ichia, his fon. The city has several other deferted and ruinous mosques. The laft lords of Taas have choen to diftinguish themselves, not by mosques, but by noble palaces, and have contented themselves with a fmall kubet for their oratory and burial-place. Thfe palaces are now the ornaments of the city. Near the city are the ruins of two ancient cities: one called Thobad, situated near mount Sabber; and the other Oddena, upon the summit of mount Sabber, over-againft Kahre. This was former the residence of the kings of the country. Its only remains are the ruins of some mosques. Taas has undergone several revolutions; but after various events, which we cannot recite, the Imam fent a Dola to this city, and it is now under the fame government as the other cities in his dominions; 48 miles E.N.E. of Mocha. N. lat. 13° 34'. E. long. 44° 10'..

TAASINGA, an island of Denmark, about 16 miles in circumference, situated between Funen and Langeland, with a town upon it of the fame name. N. lat. 55°. E. long. 10° 37'.

TAAUT, Thoys, or Tho, in Ancient Mythology, the name of a deity among the Phoenicians, and probably the fame with the Egyptian Thoys, Tho, or Hermes, the Thetate or Teutat of the Greeks, and the Mercur of the Latins. His cofnomy has been tranfmitted to us by the Phoenician writer Sanchoniathon, whose account is preferred by Eufebius, De Prap. Ev. lib. i. cap. 10. To him the Phoenicians acribe the firft invention of letters. See Mercury.

TAAWIRRY, in Geography, an island in the South Pacific ocean. There are two situated within the reef of the island of Otaheite, and on the east side of the main island. Within these islands there is anchorage within the reef that surrounds them. The French vessels under the command of M. Bougainville lay here. The name of the other island is Boourou.

TAB, the ancient Arapi, a river of Persia, in the province of Fars or Farafftan, formed by the junction of two streams, within a few miles of the town of Zeitoon. Both
A Tab species takes their rise in the recesses of the mountains of Pars; the first at the foot of the high hill of Kamarak, and the other near that of Ardicoone, 12 furlings (the furling being estimated at three English miles and three quarters) N.W. of Shiraz. This branch of the river is mentioned by Arrian in the march of Alexander. It divides Pars from Chaubfan, and passes through the centre of the town of Endian, being navigable for boats of 20 tons burthen. Nine miles above the town is a ford; and 16 miles below it, the Tab falls into the sea. When the river passes Zeitoon, the waters are perfectly sweet; but in its course over the hills, towards Endian, they become corrupted, and at that place are so brackish as to be hardly fit for use.

**TABA**, a town of Africa, on the Grain Coast.

**TABA Islands**, four small islands in the East Indian sea, lying north-west and fourth-east near the east coast of Borneo. N. lat. 2° 6'. E. long. 118° 12'.

**TABA**, or Tabo-feil, in Modern History, a name by which the Negroes, who inhabit the Gold Coast in Africa, describe their king, whose power is very arbitrary, infomuch that they regard him as being superior in nature to themselves.

**TABAB MANAM**, in Geography, a town of Abyssinia; 100 miles S.S.E. of Gondar.

**TABACUM**, in Botany, whence comes its common English name Tobacco, or, at present, Tabacco. (See NICOTIANA.) Bauhin says, after Monardes, that this appellation is derived from an island so called; but it should seem to originate from the Indian name of the plant, Tabae, or Tabaeca.

**TABAE**, in Ancient Geography, a town of Asia, in Cilicia—Allo, a town of Asia, on the confines of Pidida, on the coast of the sea of Pamphylia.—Allo, the name of three towns in Asia Minor; one in Caria, another in Perea, and a third in Lydia.

**TABAFRA**, in Geography, a town of Africa, on the Ivory Coast; 15 miles E. of Drun.

**TABAGO**, an island in the Pacific ocean, near the coast of Mexico; about three miles long, and two broad. It is mountainous, and on the north side the high land declines with a gentle defect to the sea. Near the island the soil is a black mould, and deep, but towards the top of the mountain strong and dry. The north side of the island makes a very unpleasant appearance, and seems to be a garden of fruit-trees, inclosed with others of the forest-kind. The principal products are plantains and bananas, which grow very well from the foot to the middle of the mountain; but those near the top are small, as wanting moisture. There was formerly a small town near the sea, on the north side of the island; but it was ruined by the privateers that frequented those seas. Before it is a good road, about a mile from the shore, where ships may ride very safely in 16 or 18 fathom water; 18 miles S. of Panama. N. lat. 8° 40'. W. long. 80° 9'.

**TABAGUILLA**, or Little Tabago, a small island in the Pacific ocean, near Tabago.

**TABAJANA**, a town of Africa, in the country of Woolly; 12 miles W.S.W. of Medina.

**TABALLAR POINT**, a cape on the east coast of the island of Borneo. N. lat. 2° 12'. E. long. 117° 4'.

**TABALTHA**, in Ancient Geography, a town of Africa, on the route from Tuburbum to Tacape, between Celsa, Picentins and Septimunica. Anton. Itin.

**TABALUM**, a town of Asia Minor, in the vicinity of Ionia. Herodotus.

**TABANA, Mankoup**, a town in the interior of the Tauric Carchesium. Ptol.

**TABANIE**, in Geography, a town of Egypt, on the east branch of the Nile; 6 miles S.W. of Manfara.

**TABANUS**, the Os-ffy, in Entomology, a genus of the Diptera order of insects; the generic characters of which are, that the mouth has a fleshly proboscis, terminated by two lips, and that the rostrum is furnished with two awl-shaped palpi, placed on each side of, and parallel to, the proboscis. Gmelin, in his edition of the Liurnean system, enumerates 38 species.

The insects of this genus very much resemble those of the Musca; which bee.

**Species.**

**Rostratus.** With brownish eyes, and fucker of the length of the body.

**Barbatus.** With black eyes, and fucker half the length of the body. Both the species are found at the Cape of Good Hope.

**Mauritanus.** With blackish eyes, a black spot on the second segment of the abdomen, and fucker equal to the body. Found in Barbary and Spain.

**Bovinus.** Greenish eyes; marked down the back by a series of large, whitish, triangular spots, and on each side is a similar appearance, but less distinct than that of the dorsal row. This is the largest of the British species, and, like others of its species, is seen generally in the hottest part of the day, during the middle and the decline of summer. It is very troublesome to cattle. Its larva is large and dusky yellowish, like that of a tipula, marked by transversely blackish freams or rings; reposing under ground in moil meadows, &c.; and changing into a cylindrical brownish chrysalis, with a roundish or slightly pointed extremity, from which within a month proceeds the perfect insect.

**Autumnalis.** With glaffy wings, and brown abdomen, and a whitish three-fold spot. Found in Europe.

**Calans.** With green eyes, a white line on the back, and red antenna. Found in South America.

**Tarandus.** With green eyes and feet, and the segments of the abdomen yellowish at the margin. Found in the north of Europe.

**Exestuans.** With green eyes, the segments of the abdomen white at the margin, and whitish legs. Found in Surinam.

**Fervens.** With green eyes, yellow abdomen and antenna, and brown head and thorax. Found in South America.

**Mexicanus.** With a livid body, green antenna, and greenish wings. Found in Surinam.

**Rusticus.** Cinereous, with grey eyes, and two black points in the front. An European insect.

**Bromius.** With a purple fascia about the eyes, and cinereous body. Found in Germany, and the northern part of Europe.

**Occidentalis.** With eyes having double brown fasciae, a brown body, and the abdomen marked with three yellow lines. Found in Surinam.

**Tropicus.** With eyes having triple purplish fasciae, and the fides of the abdomen ferruginous. An European insect of a brown colour, smaller than T. bovinus, and less common, troublesome to cattle, and especially to hores.

**Antarcticus.** With eyes like the former, black abdomen, and segments with whitish margins. Found rarely in Norway.

**Pluvialis.** With eyes waved with four-fold fasciae, and brown-speckled wings. This is an European species, very troublesome with us in the latter part of summer, fastening
England. A town in the Kingdom of Tunis, situated on the north coast, at the mouth of the Zaine, of which little but ruins are existing, and a small garrison; 60 miles N.W. of Tunis.

Tabarca, or Tabayuer, an island in the Mediterranean, near the coast of Africa, at the mouth of the river Zaine, which separates Algiers from Tunis. The Lomelines, a noble Genevois family, have been in possession of the little island that lies before Tabarca, at the mouth of the Zaine, ever since the time of the famous Andrea Doria, to whom the Tunics gave it, with the solemn covenant of the grand signior, in ransom for one of their princes, whom Andrea had taken captive. This place is defended by a small castle, well armed, and in good order, and protected by the coral fishery which was carried on in these seas. But, in the year 1740, that monarch of princes, Aly Bahaw, the reigning king of Tunis, took it by treachery from the Genevois, and, contrary to all justice and the right of nations, put some of them to the sword; and the rest, in number 300 or 400, he carried into captivity. N. lat. 36° 55'; E. long. 9° 58'.

Tabara. See Plana.

Tabard, or Taber, derived from the low Latin, tabarda, denotes a short jacket or coat, open on both sides, with a square collar and hanging sleeves. From the wearing of this garment, some of the shepherds on the foundation of Queen's college, Oxford, are called Tabardari.

From an inn in Southwark, whose sign was the Tabard, afterwards changed to the Tablois, Chamber and his companions set out on a pilgrimage to the shrine of Beckett at Canterbury, on which was founded his Canterbury Tales.

Tabarek, a town of Persia, in the province of Irak; 8 miles S.E. of Cabir.

Tabara, or Tabarayan, or Tabareh, anciently Tiberias, a town of Palestine, situated on the west bank of a lake, called in the scriptures the "Lake of Gennesareth," and the "Sea of Tiberias," and at the foot of a high and sharp mountain; surrounded with walls, except towards the water. This town was built by Herod Antipas, in the honour of Tiberias, and was long the capital of Galilee, and after the destruction of Jerusalem, for some time the residence of the high priest. This city Herod was obliged to people mostly with Galileans and strangers, because it being built on a ground which was full of sepulchres, the gang over which pollutes the Jews very much: for, in those days, he could scarcely get any of that nation to settle there, though he endowed it with considerable privileges, and gave its inhabitants the greatest encouragement, viz. lands to some, houses to others, to take off their scruples of conscience about treading on dead bodies. At the destruction of Jerusalem the town submitted to Vespasian, and received the Jews which escaped. In the year 1180, it was taken by the Christians under Godfrey; but in 1116, it was retaken by the Saracens, through the treachery of Raymond III. count of Thouleou. During the time of Christianity it was the seat of a bishop, suffragan of Nazareth. Near it are some warm baths. The Christians have a church here, and the Jews a seminary. In 1750, it suffered much by an earthquake; 16 miles S. of Safad.

Tabas, a town of Asiatic Turkey, in Natolia; 34 miles S. of Dignizhu.

Tabas, the ancient Tabia, a town of Persea, in the province of Chorasan, situated in a range of hills, 337 miles from Herat and 150 from Yezd. It contains a population of about 20,000 persons, and carries on a thriving trade with Herat and Yezd.

Tabasco, a province of Mexico, bounded on the north by the gulf of Mexico, on the east by Yucatan, on the south by Chiapa, and on the west by Guazaca, about 100 miles in length, but narrow. The climate is not reckoned healthy, nor is the soil remarkable for its fertility.

The
The inhabitants, however, have good farms well-stocked with cattle, which fell to good advantage. They have also great plenty of Indian corn and coca-nuts, which they fend to Vera Cruz. Most of the country is flat and moist, has many marshes and lakes well-stocked with fish. It rains nine months out of the twelve, so that the air is excessively damp; and in February, March, and April, remarkably hot, when infinite swarms of gnats and other insects are produced. The coast, from the beginning of September to the end of March, is subject to tempestuous northwesterly winds, which render sailing dangerous during that season. The Spaniards brought hither vines, lemon, orange, and fig trees, which all thrive here very well. Here are large thickets of mangrove and bamboo, and woods of cedar, Brafil wood, &c. frequented by lions, tigers, wild bears, and deer. They have a great number of rabbits, apes, and squirrels, with the common fruits of America; and three or four harvests of maize in a year; besides rice, barley, and all sorts of garden-herbs, different species of European fowls, and others to us unknown. This province was accustomed to pay its tribute to the ancient kings of Mexico in chocolate.

Tabasco, a river of North America, which runs into the bay of Campeachy, N. lat. 18° 15'. W. long. 93° 40'. On the banks of this river are some of the largest cabbage and cotton trees suppos'd in the world.

Tabasco, a town of Mexico, and capital of a province, to which it gives name, called also by the Spaniards "Nuestra Senora de la Vittoria," from a great victory obtained here by Cortez, on his first arrival. It stands on an island, at the mouth of the river Grijalva, which divides itself near the sea into two branches, of which the western falls into the river Tabasco, which rises in the mountains of Chiapa; and the other continues its course till within four leagues of the sea, where it subdivides, and separates the island above mentioned from the continent. Near it are plains, which abound with cattle and other animals, particularly the mountain-cow, so called from its resembling that creature, and feeding on a sort of mofs found on the trees near great rivers. The island of Tabasco, on which the town of that name is built, is about 12 leagues long and 2½ broad. The town is not very large, but well-built, and considerably enriched by a constant resort of merchants and traders from the interior. N. lat. 18° 20'. W. long. 93° 46'.

Tabasheer, in Medicina, a drug of high reputation in many parts of the East, the knowledge of which has been communicated to the western world by the works of the Indian physicians, by all of whom it is mentioned as an important article in the Materia Medica; and it is still considered to be administered under this and other names in Turkey and in various parts of India. The Arabian medical writers generally agree, that the Tabasheer is a production of the Indian reed. The genuine Tabasheer, according to Dr. Patrick Ruffell (Phil. Trans. vol. lxxx. p. 275.) is undoubtedly a production of the Arundo Bambos of Linnaeus; and the bamboo in which it is found, is vulgarly called the female bamboo, and distinguished by the largeness of its cavity from the male, employed for spears and lances. The bamboo, however, yields this drug only in a small quantity, varying according to the soil or situation in which the bamboo grows. For a further account of it, we refer to the Phil. Trans. ubi supra. See Arundo.

Tabaso, in Ancient Geography, a town of India, on this side of the Ganges, between Bynda and Pseudomius. Ptol.

Tabasseran, in Geography, a district of the tract of land situated along the Caspian sea, between the rivers Terek and Kur, and one of the divisions of the province of Daghestan, dependent on Persia. It lies between the Durbach and Rubas, towards their sources; extending about six German miles inland from above the territory of Derbent as far as the highest ridge of the Lefgian mountains, which is here very rocky and woody. Reinegg calculates the strength of the different tribes inhabiting Tabasseran, who, besides the Tartar, speak another language peculiar to themselves, at about 10,000 families; and, according to him, the reigning family have held the sovereignty over the country for more than 600 years. See Reinegg's General Historico-topographical Description of Caucasia, &c. The town of Tabasseran is the residence of a prince, and the centre of the trade carried on between Persia and Daghestan.

Tabaxir, in Botany, pronounced Tabafheer, appears to be a Persian name, appropriated to the Bamboo, Arundo Bambos of Linnaeus, or rather originally to an internal secretion of the stem of that plant. This is at first of a milky aspect, but subsequently concretes into a solid form, and very hard substance, compared to sugar, but more like sand or pebbles, being indeed a real siliceous earth. The discovery of its true nature was made by Mr. Macle, now Smithson, and published in the Philosophical Transactions for 1791, vol. viii. p. 368. See Arundo, and Tabasheer.

Tabazet, a word used by some writers to express highly-refined sugar.

Tabajee, in Geography, a town of Africa, in Neola. S. lat. 13° 8'. W. long. 17° 8'.

Tabay, one of the Western islands of Scotland, near the east coast of Skye. N. lat. 57° 10'. W. long. 5° 51'.

Tabby, a mixture of stone and mortar, which becomes as hard as a rock, used in Morocco. The walls of the city are formed of this sub stance.

Tabby, in Commerce, a kind of thick flax, usually watered. It is manufactured like the common taffety, excepting that it is stronger and thicker both in the wool and warp.

The watering is given it by means of a calender, the rolls of which are of iron, copper, or wood, which, bearing equally on the fluff, render the surface of it unequal, so as to reflect the rays of light differently.

Tabbying, or Watering, the passing a fluff under a calender, to make the representation of waves on it as on a tabby. It is usual to tabby mahors, ribbands, &c. Tabbying is performed without the addition of any water, or dye; and furnishes the modern philosophers with a strong proof that colours are only appearances.

Tabe, in Geography, a river of Prussia, proceeding from the Niemen, and running into the Curic-chaff.

Tabea, in Ancient Geography, a town of Asia Minor, in the Greater Phrygia. Strabo.

Tabepilly, in Geography, a town of Hindoostan, in Myfore; 25 miles W.N.W. of Banglore.

Tabella, or Tablet, Tabularium, in Pharmacy, a solid kind of elecuary, or confection, made of dry ingredients, usually with sugar, and formed into little flat mortules, or squares, more usually called lozenges, and sometimes moriselli, truces, &c. Powders, fruits, salts, &c. are dissolved with sugar, and made into tabulee, as those of the juice of liquorice for colds, &c.

We have cordial, bismuthic, saperdive, and hepatic tablets. Jellies and broths are sometimes reduced into a sort of tablets, to be carried in a pocket, and called pocket-soup. Tabella manus Christii are made of sugar of roses pearled. Tabella magnanimitatis are a sort taken by feeble old men, when
when matched with young wives, to afflict them in the affair of generation.

TABELLE Velox, in Antiquity, a name given to certain tablets, which were hung up in the temples: for, according to an ancient custom, which prevailed all over Greece, such as recovered from any dilimenter used to write in a tablet the nature and symptoms of their respective maladies, and the remedies which had been most successful. These tablets Hippocrates is said to have copied and followed when he first began to practice: and, if we believe Phliu (lib. vii. c. 37.), he learned from these the first rudiments of physic.

A tablet of this nature was discovered at Rome, not many years ago, among the ruins of the ancient temple of Æsculapius, with this inscription in Greek. Julianus is afflicted with vomiting of blood, and abandoned by men, the gods hardened to his relief, and having nourished him for the space of three days with honey, restored him to his health: for which favour he came to return thanks in the presence of the people. Tables of a similar kind, under the same denomination, were hung up in the temples by those who had escaped shipwreck, &c.

TABELLIO, Tabellaries, in the Roman law, a servitor; a kind of officer often confounded with the notary, notarius: yet the two differed in this; that the notaries only drew up and kept the minutes of acts and instruments on paper, and in notes, or short-hand; whereas the tabelliones delivered them engraved fair, on parchment, in the full executory form. The name also put the seals to contracts, and rendered them authentic.

The domestic clerks of these tabelliones, who at first wrote under them, in process of time came to be called notarii.

Palquier observes, that the tabelliones at Rome were public slaves, appointed for the keeping of contracts made between private persons. According to Loyfeau, a contract written by a notary was not perfect, or obligatory, till the tabellio had written it fair: after which, the parties subscribed it, i.e. they wrote at bottom, that they approved the contents; for signatures were not then in use.

See Signature.

"Quoniam tabellionum usus in regno Angliae non habitur, propter quod magis as sigilla authenticæ credit necesse, ut eorum facia faciliter habeatur, flatusummus, ut sigillum habeat non folum archiepiscopi, et episcopi, fed eorum officiales." 

TABENNE, in Geography, an island in the river Nile, between Dendera and the ruins of the ancient Thebes; famous on account of the retreat of the monk Pacomius and several hundred of his brethren.

TABENUS Campus, in Ancient Geography, a country of Aca Minor, on the confines of Phrygia and Mytha.

Strabo.

TABERG, in Geography, a town of Sweden, in the province of Smaland, situated on a mountain of the same name, which abounds in iron-ore; 8 miles S. of Jonkoping.

TABERISTAN. See Mazanderan.

TABERN, in Rural Economy, a term sometimes applied to a cellar, or other similar excavation, for the containing of liquor of the domestic kind.

TABERNAL Meritoria, among the Romans, Mars' hospital, or a place where disabled soldiers were maintained at the charge of the government.

TABERNACLE, Tabernaculum, op. a tent; among the Jews, a kind of moveable chapel, so contrived as to be taken to pieces, and put together at pleasure, for the convenience of carrying it from place to place, during the migration of the Israelites in the wilderness for forty years.

It was erected by Moses, in consequence of the express command of God, partly to be a palace of his presence as the king of Israel, and partly to be the medium of the most solemn public worship, which the people were to pay to him. It was erected on the first day of the first month of the second year after the Israelites' exodus from Egypt. Exod. xl. 2, 17, 26, 29, 34, 35.

The tabernacle was of a rectangular figure, thirty cubits long, ten broad, and ten high; or, according to Dr. Cumberland's reduction to English measure, fifty-five feet long, eighteen broad, and eighteen high. The two sides and one end were composed of broad boards, standing upright; each board being about two feet nine inches broad, f allen at the bottom by two tenons in each board, fitted into two mortises on the foundation; at the top by links or halps, and on the sides by five wooden bars, which run through rings or staples in each of the boards. Each side consisted of twenty of these boards, and the end of eight. Both the boards and bars were overlaid with gold; and the rings and halps were of the same metal. The foundation, on which they stood, consisted of solid blocks of silver, two under each board; each of which was about sixteen inches long, and weighing a talent, or about an hundred weight. The number of these blocks was about an hundred; ninety-six of which were laid under the forty-eight boards, and the other four were the bases of the columns that supported the veil or curtain, which divided the inside of the tabernacle into two rooms. Hence some have derived the ancient fashion of setting porphyry columns on bases of white marble.

The tabernacle had four different coverings, or carpets, thrown over one another. The first and lowest was made of fine linen, richly embroidered with figures of cherubims, in shades of blue, purple, and scarlet: and confined of ten breadth, which were joined together with blue loops and claps of gold. The next over this was made of a sort of mohair, the breadths of which were joined with claps of brais. The third carpet was made of ram's skin dyed red; and the uppermost of all was made of tachije, i.e. as has been generally supposed, badger's skins.

The east end of the tabernacle had no boards, but was sheltered with a fine embroidered curtain, hung upon five pillars of Shittim wood, over laid with gold, and supplied by Philo to touch the ground.

The inside of the tabernacle was divided into two rooms, by means of a veil or curtain, hung upon four pillars; the veil was curiously manufactured of the richest stuff, and adorned with cherubims and other ornaments, embroidered upon it. By this veil the tabernacle was divided, and learned writers have reasonably conjectured, in the same proportion with the temple, afterwards built according to its model: that is, two-thirds of the whole length were allotted to the first room, and one-third to the second; so that the room beyond the veil, which was called the holy of holies, was exactly square, being ten cubits each way: and the first room, called the sanctionary, was twice as long as broad.

Round the tabernacle there was a spacious court, one hundred cubits long, and fifty broad, surrroundd with pillars set in bales of braies, and filleted with silver, at the distance of five cubits from one another. The chief things in this court were the altar of burnt-offering, and the brazen laver. See Exod. ch. xxviii. and ch. xxx.

In the sanctuary, or first room of the tabernacle, were the altar of incense (Exod. xxx. 1—10.), the golden candlestick (Exod. xxv. 31, &c.) valued by Cumberland at upwards of five thousand and twenty-six pounds sterling, and the table of shew-bread, described Exod. xxv. 23—30. Within the second veil, in the holy of holies, was the ark of the testimony,
tab

Tellimony, and its lid or cover, called the merzy-foot, described Exod. xxv. 10—21. See Ark of the Covenant.

The learned Spencer (De Leg. Hebr. diff. i.) suggests, that Moses projected the tabernacle, with its furniture and appurtenances, after the fashion of a similar structure, which he had observed in Egypt, and which was in use among other nations; or, at least, that God directed it to be made with a view of indulging the Israelites in a compliance with their customs and modes of worship, so far as there was nothing in them really sinful: and he alleges evidence of such portable temples among the heathens, in which they deposited the most valuable sacred or religious utensils. But it has been replied to this conjecture, that it is not probable. But, on the other hand, it should seem more likely, that the heathens took these things from the Jews, who derived the whole of their religion from God, than that the Jews, or rather that God should take them from the heathens: and, besides, the Jewish tabernacle was ordered to be directly the reverse of the heathen tabernacles, both in its form, which was capable of being taken to pieces, whereas theirs was carried about entire; and in its situation, which was accommodated to the people's worshipping towards the west; whereas it was the general practice of the heathens to worship with their faces towards the east. (See Ezek. viii. 16. and Virgil Æneid. xii. 172—174.) The value of the gold and silver only, used for the work of the tabernacle (Exod. xxxvii. 24—25.), amounted, according to bishop Cumberland's reduction of Jewish talents and shekels to English coin, to upwards of one hundred and eighty-two thousand five hundred and sixty-eight pounds. Jennings's Jewish Ant. vol. ii. b. 2. c. 1. Anc. Univ. Hill. vol. i. part ii. p. 651, &c. folio.

We have also an account of two other tabernacles before the building of Solomon's temple, besides that above described. One of these was erected by Moses for himself; in which he gave audience, heard causes, and inquired of God; and, perhaps, also the public offices of religious worship were performed in it for some time; whereas it was called the tabernacle of the congregation (Exod. xxxiii. 7.) The other was that which David erected in his own city, for the reception of the ark, when he received it from the house of Obededom. 2 Sam. vi. 17. 1 Chron. xvi. 1.

Tabernacles, Fegg of. See Scenopegia.

Tabernacle is also used, of late, for a place of religious worship, appropriated to the use of those that are called Methodists.

Tabernacle, in Architecture, an ornamented chest, generally made of precious wood, metal, or marble, and placed upon Roman Catholic altars, as a receptacle for the chalice and pyx.

Tabernacle, in Pointed Architecture, a niche surmounted by a canopy of tracery work.


"A genus of shrubs, with opposite simple leaves. Stipulas between the footstalks, connected below, loose above. Corollas somewhat forked. Calyx permanent."—Brown, by whose remarks we have profited in some of the above characters. The species are all of tropical origin, and contain more or less of an acid milky juice. The flowers are white or yellow, mostly fragrant and ornamental. Two North American herbaceous species, with alternate leaves, and blueish flowers, one of them, T. Amsonia of Linnaeus, having a funnel-shaped corolla, and no pulp in the fruit, are well separated by Walter, Michaux, and other late writers, under the generic name of Amsonia.

1. T. citrifolia. Citron-leaved Tabernemontana. Linn. Sp. Pl. 308. Willd. n. 1. Ait. n. 1. Jacq. Amer. 38. t. 175. f. 13. (T. Laetecens, citri folius undulatis; Plum. Lc. 246. t. 248. f. 2. T. n. 1; Browne Jam. 182.) Leaves elliptical, pointed. Panicles axillary, flaked, cymo- fice, of few flowers.—Native of the West Indies. Jacquin observed it in Martinique; Browne in Jamaica. The French in the former island call it Bois laitue, from the milky juice with which every part abounds. The stem is shubby, erect, branched, from five to eight feet high, smooth like every other part. Leaves opposite, flaked, from four to six inches long, and from two to three and a half broad, of a fine shining bellucid green; paler beneath; wavy at the edges; furnished with a central rib, and many strong, curved, nearly opposite, transverse ones. Flowers white, with a light aromatic scent, in opposite, axillary, somewhat umbellate, flaked panicles, about twice or thrice the length of the footstalks.

Jacquin describes the foliolas as always green, acute, filled with foit orange pulp, enveloping the brown rugged seeds.

2. T. laurifolia. Laurel-leaved Tabernemontana. Linn. Sp. Pl. 308. Willd. n. 2. Ait. n. 2. Jacq. Amer. 39. (Nerium arboreum, folio laurio obtuso, flore luteo immure; Sloane Jam. v. 2. 62. t. 186. f. 2.) Leaves elliptical, bluntish. Panicles axillary, nearly fifele, cymo- fice, smooth, shorter than the footstalks.—Native of banks of rivers in Jamaica. We have seen no specimen. Sloane describes this as a tree, whose trunk is as thick as one's leg, fifteen feet high, with long crooked branches, leafy at the end. The leaves appear to be rather less pointed than in the former, and of a darker green. Flowers yellow, very sweet-scented; the tube of their corolla half an inch only in length; in the first species it measures full an inch. The flower-stalks are smooth, not fily. Linnaeus erroneously refers Browne's plant to this species, on the authority of Solander, who marked the original specimen T. laurifolia.

3. T. squamata. Scaly-flaked Tabernemontana.—Leaves ovate,
ovate, bluntish. Panicles from the forks of the branches, cymose, with feally flower-stalks. — Gathered by Commerson, in the island of Mauritius. The branches are round, forked, with minute white tubercles. Leaves three or four inches long, and two or three broad, very smooth, opaque, slightly wavy, with one rib, and many transverse veins, on smooth stems three quarters of an inch in length. Panicles in pairs from the forks of the branches, each clopen and somewhat subdivided, divericat, of about ten apparently white or yellowish flowers; their partial stalks clothed with numerous, roundish, imbricated bracteas, gradually larger upward, which we have not seen in any other species. Tube of the corolla above an inch long; limb somewhat shorter, rough with glandular hairs, on the upper side, about the centre. We cannot refer this to any described species, even in Lamark.

4. T. odorata. Fragrant Tabernæmontana. "Vahl Eclog. Amer. f. 22." Poiret in Lamark Dict. n. 17. (Cameraria Tamaquarina; Aubl. Guian. 260. t. 102. C. lutea; Willd. Sp. Pl. v. 1. 1244.)—Leaves elliptic-lanceolate, pointed, smooth and shining, on short stalks. Umbels from the forks of the branches, of about four flowers. Corolla slightly downy externally. — Found by Aublet, on the banks of rivers in Guiana, flowering in May. Vahl was induced by the remarks of Von Rohr to remove this plant hither. (See Cameraria, n. 3.) The leaves in Aublet's specimen are highly polished, about four inches long, and above one wide. Partial flower-stalks above an inch long, smooth, naked, simple. Flowers yellow, with a sweet pellacent smell; their limb longer than the tube, which measures about three quarters of an inch.

5. T. eburnata. Prickly-fruited Tabernemontana. Aubl. Guian. 263. t. 103. Willd. n. 3. — Leaves on short stalks, elliptic-lanceolate, pointed; somewhat downy beneath. Umbels dense, many-flowered, from the forks of the branches. Follicles muricate. — Native of Guiana, flowering in August. The stems are numerous, knotty, four or five feet high. Leaves five or six inches long, and two broad, smooth and green above; clothed with a slight whitish down beneath. Flowers small, yellowish; their tube dotted with red. The follicles are ovate, deflexed, an inch long, covered with crowded soft tubercles. Aublet. We have seen no specimen. The author mentions no pulp in the seed-veils.

6. T. grandiflora. Large-flowered Tabernemontana. Linn. Mant. 53. Willd. n. 4. Jacq. Amer. 40. t. 31. Lamark f. 2. — Leaves ovato-lanceolate, acute. Stem forked. Segments of the calyx unequal, very lax. — Found by Jacquin in woods at Carthagena, but rarely, flowering from July to September. A florub eight feet high, with forked divaricat, leafy branches. Leaves three or four inches long, tapering at each end, smooth and shining, on short stalks. Flowers large, noduous, two or three together on a stalk, at the side of each uppermost fork of the branches. Calyx divided into five whith, flat, ovate segments, very unequal in length, and loosely spreading, ill agreeing with the usual character of the genus; but the fruit, which is in this case much more important, is that of a Tabernemontana. Its surface is smooth and green. Jacquin.


8. T. obtusa. Blunt-leaved Tabernemontana. — Leaves obvate, obtuse. Panicles terminal, aggregate, forked, level-topped, many-flowered. — Gathered by Commerson, in the ile of Bourbon. The leaves are three or four inches long, flat, smooth and shining, with fine clove transverse veins; very obtuse, and often enarguate at the extremity; tapering at the base into a foofstalk about an inch in length. Panicles three, in our specimen, at the end of the branch, on stalks, nearly equal to the adjoining leaves, repeatedly forked, conflating of numerous yellow flowers, smaller than in most of the foregoing. We know nothing of the fruit.

9. T. amygdalifolia. Almond-leaved Tabernemontana. Jacq. Amer. 39. t. 181. f. 15. — Leaves oval-lanceolate, acute, smooth and shining. Anthers projecting out of the tube. — Frequent in woods and thickets at Carthagena. A branching milky florub, six feet high. Leaves flat, highly polished. Flowers but few on a stalk, white, powerfully scented. Filaments in the upper part of the tube, so that their anthers project above the orifice, in the form of a pointed cone. Follicles pointed, green and shining, resembling those of T. cymo, but scarcely half, or one-third, as large; their pulp orange. When this florub begins to flower, it is mostly without leaves. Jacquin.

10. T. diffusa. Two-coloured Tabernemontana. Swartz. Ind. Occ. 533. Willd. n. 7. Poiret in Lamark n. 3. — Leaves elliptic-lanceolate, smooth, tapering at each end. Stalks two-flowered, terminal, thread-shaped. — Native of bushy places in Jamaica. Swartz. The stem is six feet high, with smooth, opposite branches, quadrangular when young, leafy at the ends. Leaves two or three inches long, ailed; dark green above; pale beneath. Flower-stalks bordered, about half an inch in length. Flower-stalks very slender, smooth, one and a half or two inches long, divided rather below the middle, and bearing two or three white or yellowish flowers, with one or two straggling bracteas. Tube of the corolla half an inch long; limb shorter. The inflorance is terminal in Dr. Swartz's own specimen, as he describes it; and yet it is called axillary in the specific character; perhaps because it is, as in other species, closely attended by leaves.

11. T. multiflora. Many-flowered Tabernemontana. — Leaves elliptic-lanceolate, smooth, pointed. Stalks lateral and terminal, many-flowered, thread-shaped, corymbose. — Gathered by the late Mr. Christophor Smith, in the ile of Banda. This much resembles the last in general habit, though the leaves are somewhat larger, with an oblong obteuf point, and more recticulated beneath. The flowers too are rather larger, and differ essentially in compounding ample, repeatedly subdivided, corymbose panicules, about the ends of the branches, accompanied here and there by very minute, scattered, scale-like bracteas. The corolla tints scented, with long flander segments; its tube an inch long.

12. T. undulata. Wave-leaved Tabernemontana. "Vahl Eclog. Amer. f. 20." Poiret in Lamark n. 5. — Leaves lanceolate-elliptical, pointed, undulated, smooth, nearly sifule. Branches forked. Flowers somewhat cymo. Follicles smooth. — Native of South America, and the island of Trinidad. The leaves are five or six inches in length, tipped with a long point; contracted at the base; bright green above; pale and yellowish beneath. Flowers three or four together, in small, solitary, axillary
or terminal, cymocele clysters. Tube an inch long. Cotyledons an inch and a half in length, reflexed, even, rather pointed. We have no knowledge of this species, or of the two following, but from the authors quoted.

13. T. heterophylla. Various-leaved Tabernamontana. "Vahl Eclog. Amer. falc. 2. 22." Poiret in Lam. n. 7 — "Leaves elliptic-lanceolate; partly somewhat heart-shaped, pointed, rather wavy, smooth. Branches forked. Flowers racemose." — Native of Cayenne. The leaves immediately under the forks of the branches are lanceolate, three or four inches long, and moderately flaked; the leaf is feathery, much shorter, and almost heart-shaped. The flower-flalks are solitary, in the forks as well as at the summits of the branches, smooth and tender, each bearing from five to seven flowers, whose corolla is half an inch long, with some silky hairs about the mouth. Vahl.

14. T. Pandacæqui. Pandacæqui Tabernamontana. Poiret in Lam. n. 8. (Pandacæqui; Sonnerat Nouv. Guin. 49. t. 19.) — Leaves elliptic-lanceolate, smooth, with a blunt point. Panicles axillary, corymbose, many-flowered, half as long as the leaves. Native of the Philippine islands, where it was found by Sonnerat. He says the natives of the Isle of Lucean apply the milk of this shrub to their wounds. The stem is four or five feet high. Leaves two or three inches long, smooth, even, and quite entire, on short flalks. Flowers white; their tube an inch long; limb scarcely half that length. He did not eat the fruit. The younger Linneaus moit unaccountably referred this plant, in the Supplement, to Glicocca racemofa, with which it accords as little as can well be. It is now, on Jussieu's authority, removed to the present genus; and as he speaks decisively on the subject, Gen. Pl. 145, we presume he was acquainted with the follicles.

15. T. perjuriæfolia. Knot-gras-leaved Tabernamontana. Jacq. Coll. v. 4. 139. Lc. Rar. t. 320. Willd. n. 8. Poiret in Lam. n. 9. — Leaves lanceolate, smooth, tapering at each end. Corymbs from the forks of the branches, in pairs, divided. — Native of the island of Mauritius. The stem is shrubby, erect, slender, repeatedly branched. Leaves four or five inches long, more or less tapering at the end, dark green, shining, with a white rib and veins; their margin slightly undulated. Footflalks hardly an inch in length. Flowers yellowish-white; their tube and limb each measuring nearly an inch. We have from Commorion a specimen collected in the island above-mentioned, which answers to Jacquin's description and figure, except the leaves being less elongated; but it can scarcely be more than a variety. Another from the island of Bourbon would appear to be the same plant, but its inflorescence is lateral, from the bolls of the leaves, not from the forks of the branches. Still we dare not describe this as a separate species.

16. T. merifolia. Oleander-leaved Tabernamontana. "Vahl Eclog. Amer. falc. 2. 21." Poiret in Lam. n. 10. — Leaves lanceolate, smooth, veined, acute at each end. Clusters axillary, solitary, of few flowers. Limb of the corolla downy about the mouth. Stamens prominent. — Native of Porto-Rico. Allied to the last. Leaves two or three inches long, scarcely wavy at the margin; paler beneath; marked with a few fine lateral dilatant ribs. Footflalks half an inch long. Clusters twice the length of the footflalks, each of three or four flowers, with a small, linear, deciduous bractea to each of their short partial flalks. Corolla about half an inch long, with wedge-shaped segments, a little downy on their inner side towards the base. The stamens, (we presume the anthers only,) project out of the tube. Vahl. The specific character given by this author being quite insufficient, we have ventured to enlarge it from his description, without seeing the plant.

17. T. mauritiana. Brittle Tabernamontana. Poiret in Lam. n. 11. — Leaves ovate, obtuse, membranous; scarcely downy beneath. Clusters axillary, of few flowers. Branches with brittle joints. — Gathered by Commorion in the island of Mauritius, and by Sonnerat in the East Indies. We find no specimen in our collection answerable to Poiret's description. He says the plant is remarkable for its woody, cylindrical, fluted, smooth branches being jointed at the insertion of the leaves, and very brittle at those joints; bearing very small, oval, whitish tubercles. Leaves thin, membranous, oval, obtuse, rounded at each end, entire, a little wavy at the edges, three or four inches long, and two and a half wide; green and rather shining above; paler beneath, and very soft to the touch, but hardly pubescent; having one or two yellowish mid-rib, with fine parallel transverse veins. Footflalks thick, from six to eight lines in length. Clusters short and nearly simple, towards the ends of the branches, a little drooping. Corolla yellowish-white; its tube three or four lines long; limb short and obtuse. Fruit not examined. Poiret.

18. T. Sananco. Sananco Tabernamontana. "R. Ruiz and Pavon. Fl. Peruv. v. 2. 22. t. 144." Poiret in Lam. n. 12. — Leaves oblong, pointed, smooth, somewhat wavy. Corysms with four or five branches. Bracteeae infeverely heart-shaped. Follicles roundish-ovate, pointed. — Native of the extensive forests of Peru, flowering in August and September. A shrub twelve or fifteen feet high, or more, with smooth cylindrical branches. Leaves six or eight inches long, flaked, shining, somewhat veiny. Flowers yellowish-white, lateral and terminal, from fifteen to twenty in each corimb. Corolla large, with a very long angular tube. Follicles the size of an apricot, of a dirty white, containing many brown fluted seeds lodged in pulp. Poiret.

19. T. arcuata. Curve-fruiting Tabernamontana. "R. Ruiz and Pavon Fl. Peruv. v. 2. 22. t. 143." Poiret in Lam. n. 15. — Leaves obvate-oblong, pointed, entire, on short flalks. Coryms axillary, terebrate, many-flowered. Follicles recurved. — Common in the great forests of Peru, about Pozuzo, flowering in November and December. A tree, thirty or forty feet high, discharging, when wounded, a very copious milky juice, which hardens in the air into a gum-resin of a brown hue. The branch is an ample leavy head, and is forked, pale, slightly compressed. Leaves eight or nine inches long, on short, rather twifted, flalks. Flowers yellowish-white, with small, oval, pointed bracteeae. Follicles oblong, thick, three inches in length, reddish, full of red wrinkled seeds, in a crimson pulp.

20. T. jaffulata. Clutter-fruiting Tabernamontana. Poiret in Lam. n. 14. — Leaves oval-lanceolate, pointed, smooth, ribbed. Clusters axillary, somewhat umbellate, many-flowered. Segments of the corolla linear. Branches jointed. — Native of Cayenne. Seen by Poiret in Lamarc's herbarium. He describes the branches as very brittle at the insertion of the leaves, which are flaked, two or three inches long, an inch or more in width, rather obtuse, though pointed; shining above, reddish beneath. Flowers plentiful about the ends of the branches, in short, tufted, inclined corisms, whose ramifications are somewhat forked and jointed, with little short deciduous bracteeae. Tube of the corolla but two or three lines long; limb in five narrow, linear, obtuse segments. Fruit unknown. If it should prove muricata, Poiret thinks this species may not differ much from T. echinata of Aublet. See species 5.
21. **T. coronaria**. Garland Tabernæmontana. Ait. n. 3. Roxburgh MSS. (Nerium coronarium; Willd. Sp. Pl. v. 1. 1735. Jacq. Ic. Rar. t. 52. N. diversicata; Linn. Sp. Pl. 306. Willd. ibid. Jaffuminum zeylanica, folio oblongo, iloce albo pleno odoratifimo; Burm. Zeyl. 129. t. 59. Nandi-cervatum; Rhede Hort. Malab. v. 2. 105—107. t. 54—55.)—Leaves elliptical, pointed, smooth. Stalks forked, coriaceous, from the forks of the branches, as long as the leaves. Native of the East Indies, in a sandy soil, flowering two or three times in a year. It is said to have been introduced into the English gardens by the late Mr. Gordon, in 1770. This plant blooms at various seasons, and is ornamental as well as fragrant, though inferior in both respects to the *Gardenia florinda*, with which some of its synonyms have been confounded. Its genus is now more correctly determined in the second edition of Hort. Kew. than in the first; but a faulty specific character still remains, taken (as it seems) from Jacquin's plate, which exhibits a weak imperfect speciment. The stem is shrubby, bushy, smooth, three or four feet high, with copious forked spreading branches. Leaves two or two and a half inches long, paler beneath, on channelled footstalks half an inch in length. The corymb, in various wild or cultivated, single or double-flowered, specimens before us, consists of from three to five cream-coloured flowers, and are elevated on a stalk, an inch and a half long, always solitary, from the forks of the branches. The single corolla has a rather slender tube, an inch long, with broad segments to the limb, about the same length; but in a double flat both parts are much enlarged and thickened.

Mr. Brown has determined the *Nerium diversicatum* of Linneus, erroneously marked as biennial, to be the same plant with the above. We shall now proceed to enumerate three new species from his *Prodrumus*.

22. **T. orientalis**. Smooth Indian Tabernæmontana. Brown n. 1. —"Leaves lanceolate-oblong, pointed, very smooth, as well as the branches. Cymes repeatedly compound, smooth. Bracteas awl-shaped, not soon deciduous."—Gathered in the tropical part of New Holland, by Mr. Brown, who supplies the Curutu-Pala, Hort. Malab. 83. t. 46, cited by Linneus for his *T. alternifolia*, see our 25th species, may belong to the present plant, the leaves being erroneously represented as alternate.

23. **T. tubifrons**. Downy New Holland Tabernæmontana. Br. n. 2. —"Leaves elliptic-oblong, somewhat pointed, downy beneath like the young branches. Branches of the cymes erect, hairy as well as the calyx. Bracteas very minute, deciduous."—Native of the tropical part of New Holland. Mr. R. Brown.

24. **T. ebracteata**. Naked-flowered Tabernæmontana. Br. n. 3. —"Leaves somewhat elliptical, downy as well as the cymes. Branches and flower-flanks spreading. Bracteas none."—Found by Mr. Brown in the same country as the two last. We have seen no specimens of any of these three species.

25. **T. alternifolia**. Alternate-leaved Tabernæmontana. Linn. Sp. Pl. 308. Willd. n. 10. Poiret in Lam. n. 20. (Curutu-Pala; Rhede Hort. Malab. v. 1. 83. t. 46.)—Leaves lacerated, ovato-lanceolate. Native of sandy ground on the coast of Malabar, flowering all the year, but especially in the rainy season. A small tree, from fixe to twelve feet high, a foot in diameter. The leaves are three or four inches long, pointed, on short thick footstalks, more or less alternate, or disjunct, according to the figure, which is our only authority for that character. *Paniculae* lateral or terminal, corymbose, drooping, of about nine white fragrant flowers, whose tube is near two inches long, the limb dilated and notched, very much twisted. *Folliculi* tawny, ovate, an inch long, with a recurved point. Linneus depended solely on the Hortus Malabaricus for this species, of which he had no speciment. The circumstance of the alternate leaves, unexamined in any known Tabernæmontana, has excited a reasonable suspicion of error. See our 22d species.

26. **T. bufalina**. Buffalo-horned Tabernæmontana. Loureir. Cochinch. 117. (Capricum sylvete; Rumph. Amboin. v. 4. 133. t. 67.)—Leaves lanceolate, smooth. Stalks lateral, in pairs, single-flowered, pendulous. Native of moist shady valleys in Amboina, and of bushy places in Cochinchina, where it is called *Cây fúng thú*. A *frub* five feet high, branched, nearly erect. Leaves opposite, from five to eight inches in length, ovato-lanceolate, shining, entire. *Flowers* white, on long simple flasks. Tube long and slender, inflated at the base. *Folliculae* rather long, pointed, swelling, smooth, with an unequal surface. *Seeds* oblong, angular, imbedded in red pulp. The fruit in Rumphius's plate is more like the following. Loureir.


Loureir, from whose work and that of Rumphius all our knowledge of the two last species is derived, attributes to them an emollient and relaxing quality. Their viscid milky juice is said gently to draw out thorns from the flesh.

The herbaceous plants, supposed by Linneus to belong to this genus, confituate, as we have already said, and as Linneus himself originally thought, a very distinct one, of which we shall now treat by the name of *Amsonia*. We can give no positive account of the meaning or origin of this name, except that its author, according to Miller, was Clayton. Linneus, in his own copy of Gronovius's *Flora Virginica*, ed. 1. p. 36, has written *Amsonia*, as a generic name, to what Clayton took for a species of *Nerium*, and has subjoined also in manuscript the characters of the follicles and seeds. This plant, in the second edition of Sp. Pl. is the *Tabernemontana Amsonia*; and so it remained, till Mr. Watson restored it to rank as a genus; but without throwing any light upon the name. A familiar obscurity envelopes the nearly familiar name of *Amasonia*, (see that article,) which is reported in the *Supplementum* of Linneus to be dedicated to the honour of Amafon, a traveller in America, whom M. De Theis has baptized Thomas. But we have never been able to learn any tidings of such a peron. Whether *Amsonia*, being an error in orthography for *Amsonia*, may have been designed to commemorate the great lord Anfon, who brought home a new excellent pea, and desired botanical commemoration as much as any other eminent navigator not a professed botanist; and whether *Amsonia* be a still further corruption of the same name, we must leave in doubt. We have only to observe, that if both these names should prove to have the same origin, or be thought, as they certainly are, too nearly alike, the former, *Amsonia*, ought to be retained in preference to the latter, which is of much later date.

TABERNÆMONTANA.

—Clas and order, *Pentandria Monogynia.* Nat. Ord. Con- 

Gen. Ch. Cal. Perianth inferior, of one leaf, small, in 
five deep, acute, triangular, spreading segments, perma-
ent. Cor. of one petal, funnel-shaped; tube many times 
longer than the calyx, gradually swelling upwards, hairy 
in the throat; limb about as long as the tube, in five deep, 
lanceolate, variously spreading, oblique segments. Necks 
of five minute glands, surrounding the corolla. Stam. 
Filaments five, small, inserted into the upper part of 
the tube; anthers erect, arrow-shaped, converging, within 
the tube. Pist. Germs two, simple, ovate; style solitary, 
central, thread-shaped, about as long as the tube; stigma 
oblung, obtute. Peric. Follicles two, erect, long, cylindrical, 
pointed, defibute of internal pulp. Seeds numerous, 
potted, rough, naked, abrupt and oblique at the point. 
Eff. Ch. Corolla funnel-shaped; its limb in five deep 
oblique segments. Anthers arrow-shaped, within the tube. 
Follicles two, cylindrical, erect. Seeds cylindric, naked.


Pursh n. i. Ait. n. l. (Tabernæmontana Amsonia; 
virginianum erucrum, alternis asclepiadis foliis, floribus 
pallidè carules, radicè eafia; Plak. Almág. 35. Phytag. 
t. 115. f. 3.)—Stem smooth. Leaves ovato-lanceolate; 
flatterly hairy beneath. Panicle taller than the lateral 
branches. Limb of the corolla ascending.—Native of shady 
wet woods in Carolina, flowering in May. *Pursh.* Cultivated 
by Miller in 1759, and hardy in our climate. The 
root is flinity, perennial. Stem heraceous, erect, a foot 
high, round, leafy, nearly or quite smooth, terminated by 
a compound smooth panicle of greyish-blue scented 
flowers, and bearing two or three alternate leafy branches, 
which do not rise above the panicle till the flowers are 
paf. Corolla very hairy about the mouth; its tube pale, 
neadly half an inch long. The leaves are all alternate, on 
short footstalks, entire, pointed, two or three inches in length, and one 
in breadth; paler beneath, and minutely hairy about the edges 
and veins.

2. *A. trifidis.* Brownish-flowered Amsonia. —Stem smooth; 
it branches overtopping the panicle. Leaves ovate; sltterly 
hairy beneath. Limb of the corolla reflexed.—Brought 
from North America, by Mr. Lyon. We received a speci-
men in flower, in June 1808, from Mr. Vere's garden, at 
Knightbridge. This is rather taller than the foregoing, and 
distinguished by its leafy lateral branches rising high above 
the panicle. The flowers are smaller, of a dingy brown 
hue; the segments of their limb strongly reflexed, at leaf 
in fading. Follicles smooth, cylindrical. Perhaps Mr. Wal-
ter might have this species in view when he attributes 
tawny flowers (*floris fulvi*) to his *A. ciliata,* our 4th species.


—"Stem smooth. Leaves linear-lanceolate, acute at each 
end, very smooth."—Gathered by Mr. Lyon in Carolina 
and Georgia, flowering in May. *Pursh.* The fame as the 
first species, more abundant. *Pursh.*

4. *A. angustifolia.* Narrow-leaved Amsonia. Michaux 
n. 2. Pursh n. 3. Ait. n. 2. Venten. Choix. t. 29. 
(A. ciliata; Walter n. 2. Tabernæmontana angustifolia; 
Willd. Sp. Pl. v. 1. 1247.)—Stem downy. Leaves linear, 
erect, fringed.—In shady barren ground of Carolina and 
Georgia, flowering in May and June. *Pursh.* Flowers of the same 
disposition and colour as in *A. latifolia* and *falcirolia.* *Pursh.* 
This species is said to have been introduced into the English 
gardens, in 1774, by the late Mr. James Gordon. Its 
coospious narrow leaves are glaucous beneath, and smooth, 
except at the edges, where they are fringed with long soft 
hairs, such as clothe the stem. Ventenat says the upper ones 
are quite smooth, but this is not the case in our speci-
men. The teeth of the calyx are sometimes tipped with a tuft of 
hairs. Walter says the flowers are tawny; others describe 
them, as we find them, like those of *A. latifolia,* blue, with 
a pale, or somewhat tawny, tube. The follicles of all the 
other species, as far as we have seen, are slender, cylindrical, and 
sMOOTH, about two inches long.

**TABERNÆMONTANA, in Gardening,** contains plants of 
the woody, exotic, and hardy perennial kinds, among which 
the species chiefly cultivated for garden purposes are, the 
citron-leaved tabernæmontana (T. citrifolia); the laurel-
leaved tabernæmontana (T. laurifolia); the Virginian taber-
nombrentana (T. amsonia); and the narrow-leaved taber-
nombrentana (T. angustifolia).

These are all plants of the more tender and delicate kind, 
but more especially the two first sorts, which require 
the constant aid of artificial heat in this climate.

**Method of Culture.**—All these plants may be increased by 
seeds, which must be procured from the countries where the 
plants grow naturally, and be sown early in the spring on a 
hot-bed; and when the plants are come up, and fit to re-
move, be carefully planted out into small pots filled with 
light rich earth, and then plunged into a hot-bed of tan-
ners' bark, being careful to shade them in the heat of the 
day, until they have taken new root; after which they 
should have free air admitted to them every day when the weather is 
warm; but on cold nights have the glasses of the hot-bed 
covered with mats every evening, soon after the sun goes off 
from the bed; they must be often refreshed with water, but 
not in large quantities, especially while they are young, as 
they are full of a milky juice, and are subject to rot with 
much moisture; they may remain during the summer seafon 
in the hot-bed, by flitting up the tan to renew the heat when 
it wants it, and a little new tan being added; but when the nights begin to be cold, the plants should be removed, 
and plunged into the bark-bed in the flove, where, during the 
winter seafon, they must be kept in a moderate degree of 
warmth, and in cold weather have but little water given 
to them; they should confantly remain in the flove, where, in 
warm weather, they may have free air admitted to them by 
opening the glasses, but in cold weather be kept in a warm state. With this management they 
thrive and produce flowers; and as their leaves are always 
green, make a pleasant diversity among other tender exotic 
plants: they may be increased likewise by cuttings in the 
summer seafon, which should be cut off from the old plants, 
and laid to dry in the flove five or six days before they are 
planted, that the wounded parts may heal over; these should 
then be planted in pots filled with fresh light earth, and be 
plunged into the hot-bed of tanners' bark, and closely 
covered with a hand-glafs, shading them from the sun in 
the middle of the day in hot weather, refreshing them now and 
then with a little water: when they have taken root, they 
may be planted out into separate pots, and be treated in the 
same manner as those raised from seeds are recommended 
to be.

It may be noticed, that the third and fourth sorts are cap-
able of living in the open air here, provided they are planted 
in a warm situation; they love a light soil, rather moist than 
otherwise; of course, when planted in dry ground, they 
should be frequently watered in dry weather. They are be-
st increased by offsets from the roots, which should be 
planted out in the autumnal seafon.

Among these, the two first sorts afford variety in the flove, 
and the latter sorts in this as well as the borders in mild 
climates.
TABERNÆMONTANUS, James Theodore, in Biography, a physician and botanist, was born at Berg-Zabern, in Alsatia, and having practiced as an apothecary, and acquired some knowledge of botany, went to France, where he took the degree of M.D. Advancing in his profession, he became first physician to the Elector-Palatine, the bishop of Speire, and other parishes of rank. He died at Heidelberg, whither he had removed from Worms, in the year 1590.

Apprehending that Providence has furnished every country with remedies suitable to its diseases, he confided much in the efficacy of herbs; and particularly in the powder of mugwort. His German Herbal consists of three volumes, published separately in the years 1598, 1599, and 1592, and containing figures, copied either by himself or others from nature. This work was well received, and has been often reprinted. He also published in German a treatise on baths and mineral waters. Haller. Eloy. Gen. Biog.

TABERNAS, in Geography, a town of Spain, in the province of Granada: 15 miles N.N.E. of Almeria.

TABERNE, a town of Curditan; 50 miles E.S.E. of Kerku.

TABES, in Ancient Geography, a town of Asia, in the mountains of Parthænae, upon the frontiers of Peruia and Babylonia. Strabo and Quintus Curtius.

Tabes, in Medicine, a walking or consumption of the body, accompanied with hectic fever. The distinction which nosologists have made between tabes and atrophia, is founded on the presence of hectic fever in the former, and its absence in the latter form of disease. Such a definition of tabes, however, would comprehend phthisis, a term which is generally restricted to that species of consumption which has its origin in diseases of the lungs. (See Consumption.)

The ground of the distinction between tabes and atrophia, has already been fully discussed under the head of Atrophy: and the train of symptoms constituting the fever that accompanies tabes, is sufficiently detailed under the article Hectic Fever. Dr. Cullen has enumerated three species of tabes; the first, which he calls the puerulent, arising from suppuration, either of an internal or external part, and the seat of which may be various, according to the organ originally diseased; the second, the sordidus, being the consequence of sordida affecting different parts, but more especially the mefenteric glands; and the third, the venenata, proceeding from the operation of a poisonous substance received into the body. The other affections which have been claffed by Sauvages under tabes, such as the tabes dolalis, nutricum, fudatoria, a fanguinolux, syphilistica, and a hydrole, are referred by Dr. Cullen to the genus Atrophy; which see.

Tabes Doralis, a species of consumption arising from the excessive evacuation of semen: its symptoms and treatment are detailed under Atrophy.

Tabes Mefenterica, or mefenteric consumption, is a disease that more particularly affects children, and arises from obstruction and enlargement of the mefenteric glands. Children are liable to its attacks from the age of three or four years, and become lefs so when they have attained of eight or ten, unless they are of sordidus habits, in which case the disease may supervene at a much later period. Its relation to scrofula is clearly marked, from its more frequent occurrence in families where this disease is hereditary: but it may, at the same time, arise independently of that affection, from a great variety of causes. It may be induced by any protracted disease of infancy producing much constitutional disturbance, and more especially by such as are attended with disorder of the functions of the alimentary canal. It may often be traced to improper treatment, or unwholesome food; to long-continued irritation from teething; to the suppression of eruptions, or the incautious stopping of diarrhoea; and sometimes appears to be the consequence of exanthematic fevers, as the measles, small-pox, or scarlatina.

The presence of worms in the intestines, has very frequently been accused of laying the foundation of this disease: but it may be questioned, whether they are not more generally the consequence than the cause of derangement in the primeviattendant on this disorder.

The symptoms which attend the early stages of this affection, and before the enlargement of the glands has become sensible, are similar to those which accompany many of the diseases of the alimentary canal, more especially those produced by worms, and can hardly be distinguished from them. Indigestion occurs in various degrees, denoted by the usual signs, such as acid eructations, fetid breath, great irregularity in the action of the bowels, and in the appearance of the stools; occasional fever, occurring, however, less in regular paroxysms than happens in the remitting fever of infants, but giving a hectic flux to the cheeks, which, when the fever has subsided, are of a pallid hue. The appetite is extremely irregular; sometimes it is nearly gone, at other times it is voracious, and attended with a fene of craving, unless specially satisfied. The symptom which particularly characterizes this disease, when occurring in conjunction with those above stated, is shooting pain in the abdomen, varying considerably, both in their seat and their intensity, at different times. These pains, though felt more or less every day, occur only at intervals, and frequently, after a longer intermission than usual, they return with more severity than before.

The belly now begins to swell and to grow hard, while, at the same time, the limbs and countenance are emaciated: the strength and spirits decline; the hectic fever is more and more distinctly marked, and exerts its usual undermining influence on the constitution. Cough frequently attends this complaint in its latter stages, and the symptoms become blended with those of true pulmonary consumption. The disease of the mefenteric glands is often, indeed, found, on dissection, to have extended to other viscera, and more especially to the lungs: and tubercles, and even purulent matter, are not unfrequently found in them, although the symptoms during life did not particularly indicate any affection of these organs. The mefenteric glands themselves exhibit different appearances, according to the progres which the disease has made: in the early stages they are enlarged in their size, and are somewhat softer to the touch than in a natural state; but upon being cut into, do not exhibit any sensible deviation from their natural structure. If the patient, however, has not already sunk from the exhaustion of the constitutional affection, the disease proceeds to suppuration, the pus being intermixed with the white, soft, and curdy matter which is so peculiar to scrofula.

Mefenteric consumption is a disease of frequent occurrence, and when it has proceeded a certain length, is almost invariably fatal. Yet we find, in some rare instances, that the powers of the constitution are sometimes called forth in an extraordinary manner under the most unpromising circumstances, and the disease recovered from. In the early periods of life, indeed, we see nature abounding in resources, which a more mature age cannot supply: and there is, to use the language of the late Dr. Gregory, 'a greater luxuriance of life and health in infancy than at any other period. Infants, it is acknowledged, are more delicately sensitive to injury than those advanced in life; but to compensate this, their fibres and veins are more capable of distention, their whole system is more flexible, their fluids are less acid, and lefs disposed to putrefence; they bear all evacuations more easily,
easily, except that of blood; and, which is an important circumstance in their favour, they never suffer from the terrors of a distracted imagination. Their spirits are lively and equal; they quickly forget their past sufferings, and never anticipate the future. In consequence of these advantages, children recover from diseased, under such unfavourable circumstances as are never survived by adults. If they waste more quickly under sickness, their recovery from it is quick in proportion, and generally more complete than in older people; as diseases seldom leave those baneful effects on their constitutions so frequent in adults. In short, a physician ought scarce ever to despair of a child’s life, while it continues to breathe.”

The plan of treatment to be pursued in this disease, must be founded very much on the same principles as that of scrofula in general, modified, however, in some degree, by its peculiar seat, and by the functions of the parts affected. It is chiefly in the earlier stages that we can expect much efficacy from an alterative course of remedies in the removal of the glandular obstructions. As there is often much ambiguity between the symptoms of this disease and those occasioned by the presence of the round worm in the intestines, we should first satisfy ourselves that this is not the sole cause of the disorder. In both diseases there is a tumid belly, and emaciated extremities; so that the chief ground of distinction is derived from the effect of strong purgatives, which bring away worms in the one case, and none in the other. It is observed by Dr. Baillie, that startings and grinding of the teeth during sleep, occur very commonly in worms, but are rarely observed as symptoms of scrofulous enlargement of the mesenteric glands. Some discrimination, likewise, between the two diseases, may sometimes be derived from examining strictly into the nature of the constitution. If decided marks of scrofula shew themselves in an external part of the body, they will lead a practitioner more satisfactorily to the opinion, that the mesenteric glands are also affected with the same disease.

The principal alternative remedy on which any dependence can be placed is mercury, particularly in the form of calomel; half a grain, or the grain of which, may be given two or three times a week, in conjunction with, or succeded by, some mild purgative. On the intermediate days, small doses of alkalies, with rhubarb, may be exhibited. Great attention should, at all times, be paid to the state of the bowels, which should be kept freely open; while the acrimony of their contents should be counteracted by absorbents, such as magnesium, when there is no diarrhoea, or by prepared chalk, or gentle astringents, in small doses, when this latter state prevails. For the removal of fever, the same means are to be employed as have already been pointed out when treating of the infantile remitting fever, under the head of Diseases of Infants. The calomel, combined with purgatives, may be continued, for several weeks, till a favourable change has been effected in the size and hardness of the belly. The milder vegetable tonics, such as chamomile, or cafecharilla, may then be tried, and according as the constitution will bear them, preparations of iron should be given, in order to strengthen the digestive organs, and the system in general. Together with these means, every circumstance which can contribute to general health should be attended to. Pure air, regular exercise, gentle friction of the body and limbs, an edy drench, frequent washing of the whole body with soap and warm water, in young children, or the cold bath in older children, and especially a light and nutritious diet, with such mild aromatics as may assist digestion, are some of the principal and most effectual means of securing the ground that has been gained, and of preventing a return, as well as guarding against an attack, of the disease. For greater details on these points, see Diseases of Infants, and Scrofula.

TABEYRO, in Geography, a town of Spain, in Galicia; 5 miles S.E. of St. Jago.

TABIANA, in Ancient Geography, an island of the Persian gulf, near and west of the island of Sophthe, and opposite the promontory of Truce.

TABIANA, in Geography, a town of the duky of Parme; 13 miles W. of Parme.

TABIDIOUM, in Ancient Geography, a town in the interior of Africa, towards the source of the river Bagrada.

TABILLOLA, in Geography, a town on the south coast of the island of Mochian. N. lat. 0° 13’. E. long. 127° 21’.

TABINSK, a town of Russia, in the government of Upha, on the Bielaia; 40 miles S. of Upha. N. lat. 54°. E. long. 56° 14’.

TABLADA, a town of South America, in the province of Carthagena; 80 miles S. of Mompox.

TABLANATZ, a town of 18ria; 24 miles N.E. of Pedena.

TABLAS, one of the Philippine islands, about 25 miles long from north to south, but narrow and intersected by a deep bay on the east and west coasts. N. lat. 12° 30’. E. long. 121° 40’.

TABLATURE, in Anatomy, a division or parting of the skull into two tables.

TABLATURE, Tablatura, in Music, in general, is when to express the sounds or notes of a composition, we use letters of the alphabet, or cyphers, or any other characters not used in the modern music.

TABLATURE, in its stricter sense, is the manner of writing a piece for the lute, theorbo, guitarre, bas viol, or the like; which is done by writing on several parallel lines (each of which represents a string of the instrument) certain letters of the alphabet, referring to the frets on the neck of the instrument: of which A marks, that the string is to be strung open, i.e. without putting the finger of the left hand on the head; B shews, that one of the fingers is to be put on the first string; C, on the second; D, on the third, &c. The time of the notes is signified by marks over the letters of a hooked form, that answer to the minim, crotchet, quaver, &c. in the French tablature; but the Italians and Spaniards, till of late years, made use of figures instead of letters.

The tablature of the lute is usually written in letters of the alphabet, and that of the harpichord in the common notes.

TABLE, Tabula, a moveable, usuall made of wood, or stone supported on pillars, or the like; for the commodious reception of things placed upon it.

Mofs made a table, in the tabernacle, for laying the shew-bread upon, described by Philo Judaeus as two cubits long, one broad, and one and a half high.

Among Christians, the table, or Lord’s table, signifies the sacrament of the Lord’s supper. See Communion.

Table, Round, Knights of the Round Table, a military order suppos’d to have been instituted by Arthur, the first king of the Britons, in the year 516.

They are said to have been twenty-four in number; all selected from among the bravest of the nation.

The round table, which gave them their title, was an invention of that prince, to avoid disputes about the upper and lower end, and to take away all emulation as to places. Le Slay affuirs us, he faw the table at Winchester; at least, he says, if he might believe the keepers of it, who still
flew it with great solemnity. He adds, that the names of a great number of knights, written around it, seemed to confirm the truth of the tradition.

Larrey also, and several other authors, make no scruple to relate this fable of knighthood as matter of history: but that it is a fable, is certain; F. Papebroch having shewn, that there was no such thing as an order of knights before the sixth century.

Camden also observes, that the table at Winchester is of a structure much more modern than the sixth century. It is to be added, that Arthur himself is esteem'd by many no more than a fabulous prince.

An excellent historian observes, that Arthur was undoubtedly a great general, though his actions have given occasion to innumerable fables; and though the institution of the "Knights of the Round Table" has served as a foundation for many fabulous relations, it is not to be deemed altogether chimerical. For where is the improbability that Arthur should institute an order of knighthood in Britain, when we learn from the letters of Cæsiodorus, that Theodoric, king of the Ostrogoths, instituted one in Italy in the same century. Rapin's Hist. of Eng. vol. i. p. 39. fol.

However, others have supposed that the round table was not any military order, but rather a kind of juf, or military exercife, between two perfons armed with lances. Several authors say that Arthur, duke of Bretagne, renewed it. See Matthew Paris, the abbot Jutiniani, and F. Helyot.

Paulus Jovius says, it was under the empire of Frederic Barbarossa that the knights of the Round Table first began to be talked of; others attribute their origin to the factions of the Guelphs and Gibellins. King Edward I. built a house called the Round Table, the court of which was two hundred feet in diameter. Du-Cange Gloss. Tabula.

Table. archit. a smooth, simple member, or ornament, of various forms, but most usually in that of a long square. See PLAT.BAND.

Table. Projecting. is such a one as stands out from the naked of the wall, pede&al, or other matter which it adorns. See RAKING-TABLE.

Table. Raked. See RAKING-TABLE.

Table. Razed, an embossment in a frontifpiece, for the putting an inscription, or other ornament, in sculpture. This is what M. Perrault understands by abacus in Vitruvius.

Table. Crowned, that covered with a corniche, and in which is cut a baffe-relievo, or a piece of black marble incrusted, for an inscription.

Table. Ryfled, that which is piled, and whose surface leeks rough, as in grottos, &c. See RUSTICS.

Table. Water. See WATER-TABLE.

Table. Plain, a surveying instrument. See Plain TABLE.

Table. in Perspective, denotes a plain surface, supposed to be transparent, and perpendicular to the horizon. It is always imagined to be placed at a certain distance between the eye and objects, for the objects to be represented thereon by means of vifual rays paffing from every point thereof, through the table to the eye.

Whence it is also called perspective plane. See PERSPECTIVE.

Table, in Anatomy. The cranium is to be composed of two tables, or lamine; i.e. it is double, as if it confifted of two bones laid one over another. See SKULL.

Table of Pythagoras, called also multiplication-table, is a square formed of a hundred or more leffer squares, or cells, containing the products of the several digits, or simple numbers, multiplied by each other. See this table under MULTIPLICATION.
The twelve tables were committed to the memory of the young, and the meditation of the old; they were transcribed and illustrated with learned diligence; they had escaped the flames of the Gauls, they subsisted in the age of Justinian, and their subsequent loss has been imperfectly restored by the labours of modern critics.

It is a great pity this system of law should have perished through the injuries of time: we have now nothing of it, but a few fragments dispersed in divers authors. J. Gothofred has collected them together, and we have them in Rofinus, and some other authors. The Latin is very old and barbarous, and remarkably obscure. See Civil Law.

Although these venerable monuments of antiquity were considered as the rule of right and the fountain of justice, they were overwhelmed by the weight and variety of new laws, which, at the end of five centuries, became a grievance more intolerable than the vices of the city.

The laws of the twelve tables have been justly charged with inexcusable severity. They are written, says Mr. Gibbon, like the statutes of Draco, in characters of blood. They approve the inhuman and unequal principle of retaliation; and the forfeit of an eye for an eye, a tooth for a tooth, a limb for a limb, is rigorously exacted, unless the offender can redeem his freedom by a fine of 300 lbs. of copper. Besides the lighter chastishments of flagellation and servitude very liberally distributed by the decemvirs, nine crimes of a very different complexion are adjudged worthy of death: viz. 1. Any act of treason against the state, or of correspondence with the public enemy; 2. Nocturnal meetings in the city, under any pretence of pleasure, or religion, or the public good; 3. The murder of a citizen; 4. The maliciousness of an incendiary; 5. Judicial perjury; 6. The corruption of a judge, who accepted bribes to pronounce an iniquitous sentence; 7. Libels or libations; 8. The nocturnal mischief of damaging or destroying a neighbour’s corn; 9. Magical incantations. The cruelty of the twelve tables against insolvent debtors merits peculiar notice. After the judicial proof or confession of the debt, 30 days of grace were allowed before a Roman was delivered into the power of his fellow-citizen. In this private prison, 12 ounces of rice were his daily food: he might be bound with a chain of 15 pounds weight; and his nether was thrice exposed in the market-place, to solicit the complicity of his friends and countrymen. At the expiration of 60 days, the debt was discharged by the lots of liberty or life: the insolvent debtor was either put to death, or sold in foreign slavery beyond the Tyber; but if several creditors were alike obdurate and unrelenting, they might legally dismember his body, and satisfy their revenge by this horrid partition.

When the manners of Rome were infensibly polished, the criminal code of the decemvirs was abolished by the humanity of accusers, witnesses, and judges; and impunity became the confecution of inmoderate rigour. The Porcian and Valerian laws prohibited the magistrates from inflicting on a free citizen any capital, or even corporal punishment; and the obsolete statutes of blood were artfully, and perhaps truly, ascribed to the spirit, not of patrician, but of civil, tyranny. Gibbon’s Decl. and Fall, &c. vol. viii.

Tables of the Law, in Scripture History. See Decalogue.

Tables, New, Tabula Nova, an edict occasionally published in the Roman commonwealth, for the abolishing all kinds of debts, and annulling all obligations.

It was thus called, in regard that all antecedent acts being destroyed, there were nothing but new ones to take place.

<table>
<thead>
<tr>
<th>Table, among Jewellers. A table diamond, or other precious stone, is that whose upper surface is quite flat, and only the sides cut in angles; in which sense a diamond cut table-wife, is used in opposition to a roec-diamond. See Diamond.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table, in the Glass-Manufacture, denotes a circular sheet of finished window-glass. These tables are generally four feet in diameter, and each of them weighs 10, 15, or 11 pounds. Twelve of these is called a plate or a plate of glass. Some tables of glass have been four, and even five feet in diameter. Such have been made by Messrs. Attwood and Smith, formerly Hammond and Smith, of Gatehead, in the county of Durham; and these tables are the more valuable, as they yield larger squares than ever were made, except in plate-glass, and the quality also is of the best kind. The centre of the table of glass, where the puncting iron was attached, is of course somewhat thicker, and is denominated by the workmen a bull’s eye: nonetheless, the rest of the plate is of an uniform thickness. Table is also used for an index, or repository, put at the beginning or end of a book, to direct the reader to any passage he may have occasion for. Thus we may say, table of matters; table of authors quoted; table of chapters, &amp;c. Tables, of themselves, sometimes make large volumes, as that of Dravitz on the civil and canon laws.</td>
</tr>
<tr>
<td>Table of the Bible, are called Concordances. See Concordance.</td>
</tr>
<tr>
<td>Table-Rents. See Bord-lands.</td>
</tr>
<tr>
<td>Tables of Houses, among Astrologers, are certain tables, readily drawn up, for the assistance of practitioners in that art, for the erecting or drawing of figures or schemes. See House.</td>
</tr>
<tr>
<td>Tables, in Mathematics, are systems of numbers, calculated to be ready at hand for expediting astronomic, geometrical, and other operations. See Canon.</td>
</tr>
<tr>
<td>Tables, Astronomical, are computations of the motions, places, and other phenomena of the planets, both primary and secondary. See each planet. The oldest astronomic tables are the Ptolemaic, found in Ptolemy’s Almagest; but these now no longer agree with the heavens. In 1522, Alphonfo XI. King of Castile, undertook the correction of them, chiefly by the assistance of Isaac Hazen, a Jew; and spent four hundred thousand crowns therein. Thus arose the Alphonsine tables, to which that prince himself prefixed a preface. But the deficiency of these, also, was soon perceived by Purbachus and Regiomontanus; upon which Regiomontanus, and after him Waltherus and Warnerus, applied themselves to celestial observations, for the farther amending of them; but death prevented any progress therein. Copernicus, in his books of the celestial revolutions, instead of the Alphonsine tables, gives others of his own calculation, from the latter, and partly from his own observations. From Copernicus’s observations and theories, Eras. Reinholdus afterwards compiled the Prutenic tables, which have been printed several times, and in several places. Tycho de Brahe, even in his youth, became sensible of the deficiency of the Prutenic tables; which was what determined him to apply himself, with so much vigour, to celestial observations: yet all he did, by them, was to adjust the motions of the sun and moon; though Longomontanus, from the same, to the theories of the several planets published in his “Astronomy Danica,” added tables of their motions, now called the Danish tables; and Kepler likewise, from</td>
</tr>
</tbody>
</table>
from the same, in 1627, published the Rudolphine tables, which are much esteemed.

These were afterwards, anno 1650, turned into another form, by Maria Cunita, whoe astronomical tables, comprehending the effect of Kepler's physical hypotheses, are exceedingly easy, and satisfy all the phenomena, without any trouble of calculation, or any mention of logarithms; so that the Rudolphine calculus is here greatly improved.

Mercator made a like attempt in his Albronomical Institution, published in 1676, and the like did J. Bap. Morini, whose abridgement of the Rudolphine tables was prefixed to a Latin version of Street's "Astronomia Carolina," published in 1705.

Lambertius, indeed, endeavoured to discredit the Rudolphine tables, and framed Perpetual tables, as he calls them, of the heavenly motions; but his attempt was never much regarded by the astronomers; and our countryman Horrox warmly attacked him, in his defence of the Keplerian astronomy.

Since the Rudolphine tables, many others have been published; as the Philolac tables of Bullialdus; the Britannic tables of Vincent Wing, calculated on Bullialdus's hypothesis; the Britannic tables of Newton; the French ones of the court de Pagan; the Caroline tables of Street, all calculated on Dr. ward's hypothesis, and the Novanaljodic tables of Riccioli. Among these, however, the Philolac and Caroline tables are esteemed the best; infomuch that Mr. Whiston, by the advice of Mr. Flamsteed (a person of several authorities) used them, and believed that they would improve the Caroline tables to his astronomical lectures.

The Ludovician tables, published in 1702, by M. de la Hire, are constructed wholly from his own observations, and without the assistance of any hypothesis; which, before the invention of the micrometer, telescope, and the pendulum clock, was held impossible.

Another set of tables, Dr. Halley, the astronomer royal, long laboured to perfect. M. le Monnier, in 1746, published in his "Institutions Astronomiques" tables of the motions of the sun, moon, and satellites, of conjunctions, and of the places of the fixed stars. M. de la Hire has also published tables of the planets, and M. de la Caille tables of the sun. Mayer constructed the tables of the moon; and we have many astronomical tables of various kinds, and computed with different views, in our modern books of astronomy, navigation, &c. For an account of several, and especially of those published annually under the direction of the commissioners of longitude, see Almanacs, Ephemerides, and Longitude.

For Tables relating to annuities, &c., see Annuities, Expectation of Life, Life-Annuities, Mortality, and Survivorship.

Tables, Sexagenary. See Sexagenary.

For Tables of the Stars, see Catalogue and Star.

Tables of Sines, Tangents, and Secants, of every degree and minute of a quadrant, used in trigonometrical operations, are usually called Canons; which see. See also Sine.

Tables of Logarithms, Rhumbs, used in geometry, navigation, &c. See Logarithim and Rhumb.

Tables, Loxodromic, are tables in which the difference of longitude, and quantity of the way in any rhumb, are exhibited to every ten minutes of every degree of the quadrant variation of the latitude. See Rhumb.

Table of Heights, in English feet, from the level of the sea.

<table>
<thead>
<tr>
<th>Place</th>
<th>Height (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Cape of Good Hope</td>
<td>150</td>
</tr>
<tr>
<td>The Cape of Storms</td>
<td>180</td>
</tr>
<tr>
<td>The Smuggler's Cove</td>
<td>200</td>
</tr>
<tr>
<td>The Barrier Islands</td>
<td>250</td>
</tr>
<tr>
<td>The Island of St. Christopher</td>
<td>300</td>
</tr>
<tr>
<td>The Island of the Shipwreck</td>
<td>325</td>
</tr>
</tbody>
</table>

The Seine at Paris, mean height

<table>
<thead>
<tr>
<th>Place</th>
<th>Height (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Seine at Paris</td>
<td>15</td>
</tr>
<tr>
<td>The Seine at Lyon</td>
<td>20</td>
</tr>
<tr>
<td>The Seine at Mâcon</td>
<td>25</td>
</tr>
<tr>
<td>The Seine at Tours</td>
<td>30</td>
</tr>
<tr>
<td>The Seine at Orleans</td>
<td>35</td>
</tr>
</tbody>
</table>

The Thames at Barnstaple, mean height

<table>
<thead>
<tr>
<th>Place</th>
<th>Height (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Thames at Barnstaple</td>
<td>10</td>
</tr>
<tr>
<td>The Thames at Oxford</td>
<td>20</td>
</tr>
<tr>
<td>The Thames at Reading</td>
<td>25</td>
</tr>
<tr>
<td>The Thames at London</td>
<td>30</td>
</tr>
<tr>
<td>The Thames at Bristol</td>
<td>35</td>
</tr>
</tbody>
</table>

The Seine at Paris, mean height

<table>
<thead>
<tr>
<th>Place</th>
<th>Height (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Seine at Paris</td>
<td>15</td>
</tr>
<tr>
<td>The Seine at Lyon</td>
<td>20</td>
</tr>
<tr>
<td>The Seine at Mâcon</td>
<td>25</td>
</tr>
<tr>
<td>The Seine at Tours</td>
<td>30</td>
</tr>
<tr>
<td>The Seine at Orleans</td>
<td>35</td>
</tr>
</tbody>
</table>

The Thames at Barnstaple, mean height

<table>
<thead>
<tr>
<th>Place</th>
<th>Height (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Thames at Barnstaple</td>
<td>10</td>
</tr>
<tr>
<td>The Thames at Oxford</td>
<td>20</td>
</tr>
<tr>
<td>The Thames at Reading</td>
<td>25</td>
</tr>
<tr>
<td>The Thames at London</td>
<td>30</td>
</tr>
<tr>
<td>The Thames at Bristol</td>
<td>35</td>
</tr>
</tbody>
</table>

The Seine at Paris, mean height

<table>
<thead>
<tr>
<th>Place</th>
<th>Height (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Seine at Paris</td>
<td>15</td>
</tr>
<tr>
<td>The Seine at Lyon</td>
<td>20</td>
</tr>
<tr>
<td>The Seine at Mâcon</td>
<td>25</td>
</tr>
<tr>
<td>The Seine at Tours</td>
<td>30</td>
</tr>
<tr>
<td>The Seine at Orleans</td>
<td>35</td>
</tr>
</tbody>
</table>

The Thames at Barnstaple, mean height

<table>
<thead>
<tr>
<th>Place</th>
<th>Height (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Thames at Barnstaple</td>
<td>10</td>
</tr>
<tr>
<td>The Thames at Oxford</td>
<td>20</td>
</tr>
<tr>
<td>The Thames at Reading</td>
<td>25</td>
</tr>
<tr>
<td>The Thames at London</td>
<td>30</td>
</tr>
<tr>
<td>The Thames at Bristol</td>
<td>35</td>
</tr>
</tbody>
</table>

The Seine at Paris, mean height

<table>
<thead>
<tr>
<th>Place</th>
<th>Height (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Seine at Paris</td>
<td>15</td>
</tr>
<tr>
<td>The Seine at Lyon</td>
<td>20</td>
</tr>
<tr>
<td>The Seine at Mâcon</td>
<td>25</td>
</tr>
<tr>
<td>The Seine at Tours</td>
<td>30</td>
</tr>
<tr>
<td>The Seine at Orleans</td>
<td>35</td>
</tr>
</tbody>
</table>

The Thames at Barnstaple, mean height

<table>
<thead>
<tr>
<th>Place</th>
<th>Height (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Thames at Barnstaple</td>
<td>10</td>
</tr>
<tr>
<td>The Thames at Oxford</td>
<td>20</td>
</tr>
<tr>
<td>The Thames at Reading</td>
<td>25</td>
</tr>
<tr>
<td>The Thames at London</td>
<td>30</td>
</tr>
<tr>
<td>The Thames at Bristol</td>
<td>35</td>
</tr>
</tbody>
</table>

The Seine at Paris, mean height

<table>
<thead>
<tr>
<th>Place</th>
<th>Height (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Seine at Paris</td>
<td>15</td>
</tr>
<tr>
<td>The Seine at Lyon</td>
<td>20</td>
</tr>
<tr>
<td>The Seine at Mâcon</td>
<td>25</td>
</tr>
<tr>
<td>The Seine at Tours</td>
<td>30</td>
</tr>
<tr>
<td>The Seine at Orleans</td>
<td>35</td>
</tr>
</tbody>
</table>

The Thames at Barnstaple, mean height

<table>
<thead>
<tr>
<th>Place</th>
<th>Height (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Thames at Barnstaple</td>
<td>10</td>
</tr>
<tr>
<td>The Thames at Oxford</td>
<td>20</td>
</tr>
<tr>
<td>The Thames at Reading</td>
<td>25</td>
</tr>
<tr>
<td>The Thames at London</td>
<td>30</td>
</tr>
<tr>
<td>The Thames at Bristol</td>
<td>35</td>
</tr>
</tbody>
</table>

The Seine at Paris, mean height

<table>
<thead>
<tr>
<th>Place</th>
<th>Height (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Seine at Paris</td>
<td>15</td>
</tr>
<tr>
<td>The Seine at Lyon</td>
<td>20</td>
</tr>
<tr>
<td>The Seine at Mâcon</td>
<td>25</td>
</tr>
<tr>
<td>The Seine at Tours</td>
<td>30</td>
</tr>
<tr>
<td>The Seine at Orleans</td>
<td>35</td>
</tr>
</tbody>
</table>

The Thames at Barnstaple, mean height

<table>
<thead>
<tr>
<th>Place</th>
<th>Height (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Thames at Barnstaple</td>
<td>10</td>
</tr>
<tr>
<td>The Thames at Oxford</td>
<td>20</td>
</tr>
<tr>
<td>The Thames at Reading</td>
<td>25</td>
</tr>
<tr>
<td>The Thames at London</td>
<td>30</td>
</tr>
<tr>
<td>The Thames at Bristol</td>
<td>35</td>
</tr>
</tbody>
</table>
the cables of ships. If some pains be not taken to remove
the anchors, the number of which is annually increasing,
a clear anchorage for a single large ship will not be found.
It has been proposed to sink mooring-chains for large ships,
instead of their lying at anchor. During the S.E. winds,
which blow from September to the end of April, and
which is the season when all ships bound for the Cape re-
fort to Table bay, the only danger is that of their being
dropped out to sea from the wind and tear of the cables.
However, as the sea is not high, it is hardly possible for a
ship to go ashore, unless it be on the S. point of Robben
ifland, which being distant seven or eight miles, may be
always avoided. Within this ifland and the continent
there is excellent anchorage, where ships do not out
usually bring up. Here also ships intending to come into
Table bay generally wait the abatement of a S.E. wind, if
it shall happen to blow too strong for their working up
again. This ifland is too small and too far to afford the
leaf shelter to Table bay from the N.W. winds that blow in
the winter months. Naval officers seem to be divided in
opinion as to the preference of Table bay or Simon's bay,
(see Simon's Bay,) which lies on the eastern side of the
peninsula, in the great bay of Falfe, and which is the usual
refort of shipping for five months in the year. Both are
defective, but the latter appears to be more secure, from
the circumference of few, if any, ships having been ever
known to drive on shore from their anchors, whilst scarcely
a sea son passes without the loss of some in Table bay.
In the winter months, when the wind blows from N. to N.W.,
40 or 50 ships may lie at anchor perfectly secure in Simon's
bay, and eight or ten may be sufficiently sheltered in the
strongest south-easterly. From a survey of the Great Falfe
bay in 1797, the exact situation was ascertained of a very
dangerous rock, placed directly in the passage of ships into
Simon's bay. The months in which ships usually refer
this bay, are from May to September inclusive. The dis-
dance from Cape Town, being 24 miles, and the badness
of the road, mostly deep sand and splashes of water, render
the communication at all times difficult, but more especially
in winter; and few supplies are to be had at Simon's town,
a name given to a collection of about a dozen houses. We
have a chart of this bay in the second volume of Barrow's
Africa. S. lat. 53° 50'. E. long. 18° 15'.—Alfo, a bay on the
E. coast of Labrador. N. lat. 53° 44'. W. long.
20° 57'.

Table Island, a small ifland near the coast of Spitz-
bergen. N. lat. 86° 57'. E. long. 20° 30'.—Alfo, one of the
New Hebrides, in the South Pacific ocean. S. lat.
15° 38'. E. long. 167° 7'.—Alfo, a small ifland in the
East ifland sea, near the ifland of Paraguay. N. lat.
9° 15'. E. long. 118° 2'.—Alfo, a small ifland in the
East ifland sea. N. lat. 14° 8'. E. long. 93° 32'.

Table Mountain, a mountain of Ireland, in the county
of Wicklow; 15 miles W. of Wicklow.—Alfo, a moun-
tain of Africa, near the Cape of Good Hope, so called
from its flat summit. In fine weather this mountain is visible
at sea at the distance of 28 or 30 miles. Table mountain
supplies Table bay and Hout bay with streams of water.

Table Mountains, mountains of North Carolina. N.
lat. 36°. W. long. 81° 40'.

Table Point, a cape on the S. coast of the ifland of
Bali. S. lat. 8° 45'. E. long. 115° 11'.

Table River, a river of Louisiana, which runs into the
Mississippi, N. lat. 37° 12'. W. long. 90° 11'.

Table-Wheel, in Rope-Making. To lay ropes, &c. from
a fixed-thread line to a two-inch and half rope, a table-wheel is
fixed in the wheel-house, at the upper end of the rope-walk,
in a frame fixed in the ground, with two sliding cheeks. The
bands which work the wheels, go separately over each whirl,
and round the turning-wheel. Some have fix sets of whirls
of different sizes, with iron spindles, and nibbed or fore-
lock hooks at the outer end. A tackle-board, twelve inches
broad, and three inches thick, with fix holes for the hooks
and each of the pins that go through, is fixed above the cheeks upon cleats.

TABLEAU, Fr. This word is used frequently in
music, says Rouleau, to express the whole design of a
composition in the score: as "this score is quite a picture;"
"this opera is full of admirable paintings and imitations of
nature."

TABLET, in Pharmacy. See Tablellla.

TABLIER, Ls. in Geography, a town of France, in
the department of the Vendée; 6 miles S.S.E. of La
Roche fur Yon.

TABLING of Fines, is the making a table for every
county, where his majesty's writs run; containing the
contents of every fine passed each term.

It is to be done by the chirographer of fines of the com-
mon pleas; who, every day of the next term, after engross-
ing any such fine, fixes one of the said tables in some open
place of the said court, during its sitting; and likewise
renders to the sheriff of each county a content of the said
tables made for that respective county, the term before the
affizes, to be affixed in some place in the open court, while
the justices sit.

Tabling, in Ship-Building, letting one piece of timber
into another by alternate scores or projections from the
middle, so that it cannot be drawn afunder either lengthwise
or sidewise; such are beams, &c.

Tabling, in Sail-Making, a broad hem made on the
skirts of sails, by turning the edge of the canvas over and
fewing it down. It is to strengthen the sail for sewing on
the bolt-robe.

TABO DAGROU, or Little Dieppe, in Geography, a town
of Africa, on the Grain Coaſt.

TABO Dune, a sea-port of Africa, on the Ivory Coaſt;
90 miles from Cape Palmas.

TABOA, a town of Portugal, in the province of Beira,
on the Mondego; 9 miles S. of Vifen.

TABOCANA, a town of Africa, in the kingdom of
Quoja. N. lat. 5° 55'.

TABOCURU, a river of Brail, which runs into the
Atlantic, near the ifland of Maranhao. S. lat. 2° 40'. W.
long. 45° 30'.

TABOGA. See Tabago.

TABOLOTA, a town of Mexico, in the province of
Culiacan; 30 miles W. of Culiacan.

TABON, in Natural History, a name given by the
people of the Philippine iflands to a bird called in other
places daie, and remarkable for the largeness of its eggs;
though some accounts of these are certainly fabulous.

TABONES, in Geography, one of the small Philippine
iflands, near Mafbate. N. lat. 12° 12'. E. long. 123° 5'.

TABOO, a town of Africa, and capital of a country,
situated to the E. of Sahara. N. lat. 24°. E. long. 12° 10'.

Taboo, a term used in the Sandwich iflands to denote a
kind of religious interdiction, of very powerful and exten-
tive operation. With places and persons that were tabooed,
all intercourse was prohibited. The word was also used to
express any thing sacred, or eminent, or devoted. Cook's

TABOR, or Hadadlic Hory Tabor, i.e. the camp of
Mount Tabor, in Geography, a town of Bohemia, in the
circle of Bechin, founded by the Hufites, situated on a
mountain, near the river Luznice, is naturally strong, and
D.
it is fortified in the ancient manner, with a ditch, walls, and bulwarks. It had been the camp of John Ziska in the year 1420, and was raised to a royal borough by the emperor Sigismund. It was taken by the Catalans by Rodolph II. in 1618, and also in 1621, 1648, and 1744; 10 miles N.E. of Bechin. N. lat. 40° 27'. E. long. 14° 28'.

**Tabor, Mount,** a mountain of Palestine, frequently mentioned in the Old Testament. (See Josh. iv. 18. Psa. xcvii. 12. Jer. xxxiv. 12. Hof. v. 1.) It stands about the middle of Lower Galilee, between Nazareth and the country of Gennesareth. According to Josephus, it is 20 furlongs in height, and 26 in compass. It is an inflated mountain, situated on a plain (that of Edron), and having a level area at the summit, very fertile and pleasant. According to Maundrell, this area is of an oval figure, extending in breadth about a furlong, and two furlongs in length. Josephus says, that he caused it to be surrounded by walls, within the space of 40 days, that he might thus, without doubt, render it more inaccessi-

able to the Romans.

An ancient tradition informs us, that Jesus was transfigured upon mount Tabor (see Matt. xvii. 2. Mark, ix. 2. Luke, ix. 28.), and that this is the place which is called by St. Peter the "holy mount." (2 Pet. i. 18.) Some learned authors, however, are of opinion, that the transfiguration happened upon a mountain near Cafarea Philippi, i.e., upon mount Parium, which is very high, according to Josephus. We find the city called Tabor, mentioned in 1 Chron. vi. 77; but it is not well known, how it was situated with relation to the mount.

**Tabor, Tabour, Tabat, or Tabourin, a small drum;** (which feo.) It is an accompaniment to a small pipe or fife; instruments very animating in a country dance.

**TABORITES, or THABORITES, in Ecclesiastical History, a branch or sect of the ancient Hufites.**

The Hufites, towards the beginning of the 15th century, dividing into several parties, and about the year 1420, into two great factions; one of them retired to a little mountain or rock, situate in Bohemia, 15 leagues from Prague, and there put themselves under the conduct of Ziska; building themselves a fort or castle, and a regular city, which they called Tabor or Thabor, either from the general word *tabor,* which in the Slavonic language signifies *castle,* or from the mountain Tabor, mentioned in Scripture; and hence they became denominated Thaborites. Those of the other party were denominated Calixtines.

The Taborites not only inflicted upon reducing the reli-

**TABU,** in Ancient Geography, a river of Belgic Gaul, in the country of the Morini, near Geffloriacum Navale. Ptol.
The wood of the tree makes good timber for ships, and
the gum it yields serves there for their caulking, though its
chief use with us is in medicine.

Two forts of this resin are sometimes to be met with.
The helt, called tacamahaca in shells, from its being col-
lected in a kind of round shells, is somewhat nutaceous and
soft, of a pale yellowish or greenish colour, a bitterish aro-
matic tinct, and a fragrant delightful smell, approaching to
that of lavender and ambergris. This sort is very rare.
That commonly found in the shors is in transparent grains
or globes, of a whitish, yellowish, brownish, or greenish
colour, and of a less grateful smell than the foregoing.
The first is said to exude from the fruit of the tree; the
other from incisions made in the trunk. The tree, as raised
among us, affords in its young buds, or the rudiments of
the leaves, a resinous juice of the same kind of fragrant.

Tacamahaca is chiefly used as an ingredient in warm
nervine plasters; though the fragrance and taste of the finer
sort indicate its being applicable to other purposes, as an
internal balsamic corroborant. Both kinds diffuse in rec-
tified spirit into a gold-coloured liquor, with a small quan-
tity of remaining impurity; they also impregnate water
considerably with their smell and taste, but give out very
little of their substance to this menstruum. Lewis. The
Indians are said to use it for all kinds of pains. Schroder
affirms, that he has seen intolerable pains in the leg removed
by it.

TACAMES, or ATACAMES, in Geography, a government
of South America, in the province of Quito, situated W.
of the western Cordilleras of the Andes, bordering northward
on the department of Barbaclas, in the government of Popayan,
westward on the South Sea, and southward on the territory
of Guayaquil, and reaching along the coast from the island
of Tumaco and the house of Huimal, which lie in N. lat.
1° 30', to the bay of Caracas, and the mountains of Balfano,
in S. lat. 8° 34'. This jurisdiction was long neglected af-
ter the conquest of it by Sebastian de Belalcazar, the intro-
duction of the Christian religion, and its homage to the king
of Spain. At length, however, it was discovered that by
making settlements here, the intercourse and commerce be-
tween Quito and Terra Firma would be facilitated; and
with this view, Paul Durango Dolgadillo was, in the year
1621, appointed governor of Atacames and Rio de las
Esmeraldas. He was succeeded by Francisco Perez Mel-
nacho in 1626, and other governors, who failed in the ac-
complishment of the object for which they were appointed:
at length Don Pedro Vicente Maldonado, in 1741, laid
open a direct communication betwixt Quito and the Rio de
das Esmeraldas, and in recompense of his successes he was
confirmed as governor in 1746, and in the following year
the country was formally constituted a government. This
government contains twenty towns, which are but small and
poor, five of them situated on the sea-coast, and the others
being inland places. The inhabitants of the five towns are
Spaniards, Mestizos, Negros, and Cafts, which sprang from
these three chaffes. Thiole of the other fifteen are in general
Indians, among whom are few Spaniards, Mulattos, or
Negros. The spiritual concerns of the diocese are entrusted
to eleven priests, who reside in the great towns, and occa-
sionally visit the others, in which are chapels of ease.

The temperature of Atacames is like that of Guayaquil,
and accordingly it produces the same kinds of vegetables,
grains, and fruits; some of them to greater perfection, on
account of its more elevated situation. It likewise pro-
cuces in great abundance vanillas, achoites, farfaparillas, and
indigo. Considerable quantities of wax are made here, and
the forests of the country afford a great variety of trees of

---

TACUE', in Geography, a town of Egypt, on the Nile;
9 miles S.W. of Menef.

TACUIL, a town of South America, in the province
of Tacum; 20 miles E. of St. Fernando.

TABULAR SIRIUS, in Mineralogy, Spatlium tabularium, Haüy;
A species of lime-flour, generally of a greyish-white colour,
but sometimes inclining to greenish-yellow or reddish-white.
It occurs massive and crystallized in rectangular four-sided
plates. The lunitre of the principal fracture is shining and
pearly; the fracture is imperfectly lamellar. Tabular spar
occurs in large distinct prismatic concretions, which are
prominently aggregated; it is translucent, and phospho-
refractive when scratched with a knife; its specific gravity is
2.46. It is sometimes friable. When put into nitrous acid
it effervesces, and then falls into grains. It is insusible by
the blowpipe. The analysis, as given by Klipproth, is

<table>
<thead>
<tr>
<th></th>
<th>-</th>
<th>-</th>
<th>50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lime</td>
<td></td>
<td></td>
<td>45</td>
</tr>
<tr>
<td>Water</td>
<td></td>
<td></td>
<td>5</td>
</tr>
</tbody>
</table>

This mineral is of rare occurrence; its locality, as given
by Stütz, is at Dogaalka, in the bannat of Temefin, in
Hungary, where it occurs in blue-coloured primitive lime-
flour, with garnets, actinolite, tremolite, and variegated
copper. It is said by E. to occur at Ozavitzza. In
the new system of mineralogy proposed by Berzelius, this
mineral is denominated a bicarbonate of lime; the oxygen
contained by the different constituent parts being in the propor-
tion of 6.3 and 1; the flexes containing twice the oxygen
of the lime, and the water the sixth part.

TABULARIUM, among the Romans, the name of
that part of the treasury where the Elephantine books were
kept.

TABULARIUS. See Tabellio. TABULARUM APERTURA. See Apertura.

TABULATUM. See Tabella.

TABUM, a word used by medical writers, to express a
thin, fainious, and putrid humour, flowing from old ulcers,
or from mortified parts, in cafes where the vital powers are
not sufficient for the generation of a perfect or concocted
mater.

TABY, in Geography, a town of Sweden, in Earl Goth-
land; 14 miles S.E. of Nordkioping.

TACA, a town of Japan, in the island of Xiococo; 20
miles S.W. of Tosa.

TACALALPO, a town of Mexico, in the province of
Tabaco; 25 miles S.W. of Tabaco.

TACALAYO, a town of South America, in the province
of Chaco; 35 miles N. of St. Salvador de Jugui.

TACALEA, a town of South America, in the province
of Carthagena, at the confluence of the Cauca and Madalena;
85 miles S.E. of Carthagena.

TACAMAHA, in Gardening, a tree of the orna-
mental and sweet-smelling kind, which is often planted out
in shrubberies, borders, and other parts of pleasure-grounds
with much propriety and advantage in its appearance, and
the grateful odour which it diffuses all around it. See
Populus.

TACAMAHACA, or TACAMACHA, a kind of reinosus gum,
distilling from the trunk of a very large tree, a species of
poplar, growing in New Spain, Canada, and other parts of
America; but in the greatest abundance, as it is said, in
the island of Madagascar.

The tree is not unlike our poplar-tree, only bigger and
taller; its leaves long and green, its fruit red, of the size of
our walnuts, exceedingly reinosus, and containing a floxe
like our peaches. See Populus Balsamifera.
large fire and lofty height, fit for domestic and naval purposes. (Juan and Ulloa's Voyage, vol. i.) M. d'Anville, in his map of Quito, has marked the supposed loft mine of Emeralds, about 20 miles to the south of the town of Tacames, which is situated in a bay of the Pacific ocean, to which it gives name; 110 miles N.W. of Quito. N. lat. c° 52'. W. long. 62°.

TACAPHORIS, in Ancient Geography, a town of Africa, in the interior of Marmarica. Ptol.

TACARIGUA, Bay or Lake, in Geography, is situated in the government of Caracas, in America, about one and a half league from the mouth of the river Tuy. Its form is circular, and its measure is about seven leagues from the sea, on the N.E. to its deepest reefs on the S.E. It abounds in all kinds of seas-fish, and is remarkable for the great number of alligators which are seen in it.

TACASARTA, in Ancient Geography, a town of Egypt, upon the route from Memphis to Pelusium. Anton. Itn.

TACASUKI, in Geography, a town of Japan, in the island of Nippon; 12 miles N.W. of Meaco.

TACATO, a town of Japan, in the island of Nippon; 48 miles S.S.W. of Jedo.

TACATUA, Tacus, in Ancient Geography, a town situated on the coast of Africa, between Runicades and Hippone; E. of the promontory of Tapios, and W. of that of Hippi.

TACAÚ, in Geography, a town of Japan, in the island of Nippon; 90 miles N.W. of Jedo.

TACAXI, a small island of Japan, on the S. coast of the island of Ximo, at the entrance into the gulf of Ximabora.

TACAZZE, a river of Africa, next to the Nile the largest in Upper Abyssinia. Its principal branch rises in Angot, in a plain champagne country, about 200 miles S.E. of Gondar, near a spot called Souami Midre. It has three spring-heads, or fountains, like the Nile: near it is the small village Gourri, magnifying cold. The other branch of the Tacazze rises in the frontiers of Begemder, near Dabeou, whence, running between Goulion, Lafa, and Beleven, it joins with the Angot branch, and becomes the boundary between Tigré and Amhara. This river was called the Siris, or the river of the dog-flies, whilst the uncivilized people, the Cuhites of the island of Meroé, resided upon its banks. It was then called the Tannuth Abay, or the letter of two rivers that swelled with the tropical rains, which was the name given to it by the peafants, from a comparison of it with the Nile. It was the Tacazze in Dorkin, or the dwelling of the Taka, before it joined the Nile in Baja, and it was the Aflaboras of those of the ancients that took the Nile for the Siris. It is now the Abara, giving its name to that peninsula, which incloses on the E. as the Nile does on the W. and which was formerly the island of Meroé. Tacazze is a pleasant river, shaded with fine lofty trees, and having its banks covered with tamarisks and buffel singularly fragrant. Its stream is very limpid, its water excellent, and it abounds with a great variety of fish: its coverts are also full of all sorts of game. During the inundation, it carries in its bed nearly one-third of all the water that falls in Abyssinia, rising to about three fathoms, tearing up rocks and large trees in its course, and forcing down their broken fragments scattered in its stream, with a noise like thunder echoed from a hundred hills. This river, though in many respects beautiful, has its disadvantages. From the falling of the first rains in March till November, it is death to sleep in the country adjoining to it, both within and without its banks. The inhabitants retire and live in villages on the top of the neighbouring mountains; and these are all robbers and affaffins, who descend from their habitations in the heights to lie in wait for, and plunder the travellers who pass that way. Its abundance of fish draws together a number of crocodiles: in its adjacent thickets are vast multitudes of lions and hyenas. The ford of this river is situated in N. lat. 15° 42' 45'. Bruce’s Travels, vol. iii.

TACCA, in Botany, a Malay name, used by Rumphius, and adopted by the classical Forster, as well as by the younger Linnaeus. The word being, though barbarous and unquestionable, easy of pronunciation, we are induced to acquiesce in these authorities, and to retain it, along with Autuba, Pandanus, and a few other names so circumstanced. Sir Joseph Banks and Dr. Solander had called the same genus, very elegantly and judiciously, Chaitrea, from χάττος, a flowing man, or head of hair, in allusion to the spreading tuft of long capillary filaments, apparently formed of leaves, or abortive flaks, accompanying the flowers.—Forl. Gen. t. 35. Linn. Suppl. 37. Schw. 229. Willd. Sp. Pl. v. 2. 200. Mart. Mill. Dic. v. 4. Brown Prod. Nov. Holl. v. 1. 340. Ait. Hort. Kew. v. 2. 306. Juff. 56. Lamarck Ill. f. 2. 222. Gartn. t. 14.—Claf. and order, Huan-


Gen. Ch. Cal. Pieranth superior, of one leaf, in fix very deep, elliptic-oblong, equal, converging, permanent segments. Cor. none. Stem. Filaments fix, opposite to the segments of the calyx, into whose base they are inserted, and half as long, equal, dilated, flat, oblong, incurved and vaulted at the summit: anthers sessile in the hollow of each filament, of two distinct lobes. Pfll. Germen inferior, roundish; ſtyle short, cylindrical, with three funnels; frig-

mas three, spreading, dilated, cloven. Peric. Berry ovate, angular, of one cell. Seeds numerous, ovate, fribate, "inserted into three receptacles annexed to the coat of the berry." Brown.


1. T. pinanitifida. Pinatifta Tacea, or Otaheite Saler.—Linn. Suppl. 251. Fori. Prodr. 36. Pl. Ecol. 59. Wild. n. i. Ait. n. 1. Louire. Cochin. 360. (Tacea; Rumph. Amboim. v. 5. 324—326. t. 112—114. Chaitrea Tacea; Banks IC. Indd. apud Bibl. Linn. Leontice Intopetaloides; Linn. Sp. 449. "Leontice Intopetaloides; Amaranth. in Comm. Pet. v. 8. 211. t. 15."—Leaves pinatifid.—Native of the Eaft Indies, Cochinchina, the geographical part of New Holland, and the Society Islands; brought to England by Capt. Eligh, in 1793, but has not yet flowered. Aiton. The root is tuberous and perennial. Leaves one or two, radical, on long flaks, erect, deeply three-cleft, with deeply and variously pinatifid, acute, entire lobes, a foot long, smooth, reticulated with veins. Footstalk hollow, smooth. Flower-stalk radical, about a yard high, hollow, erect, unbranched, terminating in a simple umbel of several drooping, green, somewhat glaucous, flowers, accompanied by a involucreum of about two or three upright, partly pinatifid, green leaves, near two inches long; with a greater number of much longer thread-shaped bodies, suspended by Mr. Brown to be abortive flower-flasks. The berrics are larger, than a gooseberry, but little juicy when ripe.

Forster says the fresh root is intensely bitter and acrid, though somewhat milder when cultivated. By being grated, and repeatedly washed in fresh water, it yields a very white mild powder, like flour, which is dried in the sun, and then serves for food, either in the manner of Salep, or baked in the form of cakes, which are even better than those made of Sago. The former mode of using this powder
is customary in the South-sea, the latter in the Molucca islands. This root is also applied as a plaster, we purify fresh, for deep wounds made with darts or other weapons. It is well known that a similar powder, or mild wholejece flour, is obtained, by walking, from the roots of Iatrophora Manilabot, and various species of Arium, even our common Arium maculatum, as well as from raw potatoes.

2. T. integerrima. Entire-leaved Tace. Gander in Curt. Mag. t. 1488. Ait. Epit. 375.—Leaves ovate, undivided. Native of the East Indies, from whence it was sent by Dr. Roxburgh to sir Abraham Hume, and flowered in the Rose at Wormleybury, in June 1812. The leaves are four or five inches long, probably often more, smooth, quite simple and entire, with one rib and many oblique veins; each on a flout, channelled, brown spots. Flowers umbellate, erect or decumbent, of a dingy green, with purple petals. Leaves of the involucrum large, ovate, pale green with many purple ribs, and accompanied by a few white thread-shaped filaments, resembling the former. We have seen no specimen in flower.

TACE, Ital., in Mycis, be silent.

TACET, Lat., is used when a vocal or instrumental part is to be silent during a whole movement: as in a mas, 'Christe taceat'; in a concerto or sonata, 'Largo tacet,' &c.

TACET, Joseph, in Biography, an eminent performer and master on the German flute, born, we believe, in France; but who came to England so early, and continued here so long, that by forgetting his own language, he spoke English like a native of the isle. He was the first to adopt the additional keys of Quantz to the German flute, in order to correct the bad notes, and increased their number from three to five; though, we believe, he seldom used them all.

TAC-FREE, in Old Charters, an exemption from payments.

TACHAN, in Geography, a small island in the Chienne sea, near the coast of Cochinchina. N. lat. 12° 35'. E. long. 100° 14'.

TACHAR, a town of Tihiet; 23 miles S. of Tourfan.

TACHARD, Guy, in Biography, a French Jesuit, who, after accompanying chevalier de Caumont, and the abbé de Choisy, on an embassy to Siam, returned to Europe in 1888, and having made another voyage to the Indies, died at Bengal about 1694. His 'Two Voyages to Siam,' in 2 vols. Paris, 1686 and 1689, re-printed at Amsterdam in 1700, well received at the time of their publication, have sunk in reputation on account of the credulity and exaggeration of the author, of which satisfactory evidence has been given by chevalier de Forbin, in his Memoirs. Nouv. Dict. Histoire.

TACHAR-SEGHN, in Geography, a town of Tihiet; 50 miles S. of Tourfan.

TACHAS, in Ichthology, a name given by some authors to the manati, or tea-cow.

TACHASARA, in Ancient Geography, a town of Aha, in the interior of Media, between Zalaca and Pharambura. Ptol.

TACHAU, or Tachow, in Geography, a town of Bohemia, in the circle of Pilfen, taken by Zicka by assault, and sacked in the year 1427; 34 miles W. of Pilzen. N. lat. 49° 47'. E. long. 12° 40'.

TACHBACH, a town of Germany, in the county of Henneberg; 8 miles E.S.E. of Meinungen.

TACHEMAL-ONDOUG, a town of Chinefe Tartary. N. lat. 45° 59'. E. long. 122° 31'.

TACHEMISO, or Tachemissus, in Ancient Geography, an island of Ethiopia, in the vicinity of Libya, partly occupied by the Egyptians, and partly by the Ethiopians.

TACHENS, in Geography, a lake of the archbishopric of Salzburg, five miles long, and about one wide; 14 miles N.W. of Salzburg.

TACHIA, in Botany, called Tachi by the Galibus in Guinea, because the hollow stem and branches of this shrub serve as a retreat for ants, the above word signifying, in the language of those people, an ant’s nest. Aublet Guinea. 75; t. 20. See MYMERMIA.

TACHIBOTA. See SALMASIA.

TACHIGALIA, Tachigali of the Galibus in Guinea. See CUBRA.

TACHIOU-I-CAO-HOTUN, in Geography, a town of Corea; 425 miles E. of Peking. N. lat. 40° 11'. E. long. 124° 53'.

TACHYGRAPHY, called also Brachygraphy, formed from ταχήν, τάχος, and γράφω, writing: the art of quick or short writing.

There have been various kinds of tachygraphy invented: among the Romans, there were certain notes used, of each of which signified a word.

The rabbis have a kind of tachygraphy formed by abbreviations, which made a kind of technical words; wherein each consonant stands for a whole word; as דב, דב; חס, חס: which stands for rabbi Schelomoh Jarri. See NOTARIUS.

In France, &c. the only tachygraphy used is the re-trenching of letters, or even whole syllables of words, as in liver for levée, aut for autem, d for fed, s for non, participation for participation, &c.

The first printers imitated these abbreviations; but at present they are almost laid aside, except among ferricen, &c.

In England we have great variety of methods of tachygraphy, or short-hand; more by far, and those much better, easier, speedier, and more commodious, than what are known in any other part of the world: witness Shelton’s, Wallis’s, Rich’s, Mason’s, Webbe’s, Wollon’s, Macaulay’s, Anquet’s, Gurney’s, Lyle’s, Byrom’s, Rees’s, and several other short-hands. See STENOGRAPHY.

TACISSO, Jeung, in Geography. See TASSAU-DUN.

TACIT Acceptance. See Acceptance.

TACIT Community. See COMMUNITY.

TACIT Decree, in Roman Antiquity, secret deliberations, to which none but old senators were admitted. J. Capitolinus mentions a decree of this secret kind, which he calls S. C. tacitum, and says, that the use of them among the ancients was derived from the necessities of the public, upon whom some imminent danger from enemies, the senate was either driven to some low and mean expedients, or to such measures as were proper to be executed before they were published, or such as they had a mind to keep secret even from friends; on which occasions they commonly recurred to a tacit decree, from which they excluded their clerks and servants. performing that part themselves, left any thing should get abroad. Capitol. de Gordian. c. 12.

In the early times of the republic, there are severe influences mentioned by historians of such private meetings of the senate, summoned by the consuls to their own houses; to which none but the old or proper senators were admitted, and of which the tribunes usually complained. Vide Dion. Halic. I. x. 40. l. xi. 55. 57. Middlet. of Rom. Sen. P. 90.

TACITUS, CAIUS CORNELIUS, in Biography, a well-known historian, was born about the year of the Christian era 57, at Interamna, or the modern Terni. His father was a Roman knight, and procurator of Belge Gaul. Devoted from his youth to the cultivation of literature and rhetoric,
Tac

Tacitus, M. Claudius, an emperor of Rome, who was advanced to this eminence from the rank of senator, to which he belonged at the time of Aurelian’s death, A.D. 275. He was then about 75 years of age, having been consul twice, bearing the character of distinguished wisdom and moderation, and enjoying a patrimony valued at between two and three millions sterling. An interregnum took place in consequence of the refusal of the army and senate to nominate an emperor, and he had lived nearly eight months. Tacitus wished to refer the choice to the army; but finding that he was the person to whom the attention of the public was directed, he withdrew to his country seat in Campania, and continued there two months. At length, the consul convoked the senate, and Tacitus appeared in the assembly. Being asked his opinion on the subject that had occasioned delay, he arose to reply; but he was immediately maltreated, amid general acclamations, with the titles of Auguftus and emperor. The plea of his age and infirmities was of no avail; contrained to accept the high honour on Sept. 25, A.D. 275, he entered on his office; the Roman people and the prætorian guards approving and confirming his election. His first object was to restore to the senate rights and privileges, which served to render the constitution a limited monarchy. After thus gratifying the senators, he proceeded to regulate and reform the public morals; exhibiting in his own conduct an example of simplicity and frugality, whilst he was unfailingly munificent in his attention to public objects. To literature he was a distinguished patron; and he paid particular respect to his accessor, the historian Tacitus, directing ten copies of his works to be annually deposited in the public libraries. In order to secure the attachment of the army, he visited the camp at Thrace at the commencement of the year 276, promised the usual donation, and inflicted punishment on the principal persons who had been concerned in the murder of Aurelian. In procès of time, dissensions broke out amongst the troops, and the malcontents being joined by the murderers of Aurelian, who had made their escape, either by direct violence, or by the vexation which they occasioned to the aged emperor, terminated his life at Tyana, in Cappadocia, after a reign of 200 days. Crevier. Gibbon.

Tack, in Sail-Making, the foremost lower corner of all fore and aft sails.

Tack, a rope used to confine the chaps of the main and fore courses forward occasionally in a fixed position, and also to confine the tacks of stay-fails, boom-fails, and fore-fails of foops; and the outer lower corners of fludding-fails. The tacks of the main and fore courses are ropes cable-laid, and made tapering, having a large wall-knot at one end, which prevents its drawing through the clue of the sail.

Tack is also applied by analogy to that part of any fail to which the tack is usually fastened. A ship is said to be on the starboard or larboard tack when she is cloée-hauled, with the wind upon the starboard and larboard side; and in this sense, the distance which the sails in that position is considered as the length of the tack; although this is more frequently called a board. Falconer.

Tack, To, in Sea Language, is to change the course from one board to another, or to turn about the ship from the larboard to the starboard tack, in a contrary wind.

Tacking is also used, in a more enlarged sense, to signify that manœuvre in navigation, by which a ship makes an oblique progression to the windward, in a zigzag direction. This, however, is more usually called beating, or turning to windward.
windward. In order to explain the theory of tacking a ship, recourse must be had to the two first laws of motion, recited under Laws of Nature: according to which, it is easy to conceive how a ship is compelled to turn into any direction, by the force of the wind acting upon her sails in horizontal lines. For the sails may be so arranged as to receive the current of air, either directly, or more or less obliquely: hence the motion communicated to the sails must necessarily confine with that of the wind upon their surfaces. To make the ship tack, or turn round with her head to the windward, it is therefore necessary, after she has received the first impression from the helm, that the head-sails should be so disposed as to diminish the effort of the wind, in the first instant of her motion, and that the whole force of the wind should be exerted on the after-sails, which operating on the ship's stern, carries it round like a weathercock. But since the action of the after-sails to turn the ship will unavoidably cease, when her head points to the windward, it then becomes necessary to use the head-sails to prevent her from falling off, and returning to her former situation. These are, accordingly, laid abaft on the lee-side, to push the vessel's fore-part towards the opposite side, till she has fallen into the line of her course thereon, and fixed her fails to conform with that situation.

The first effort to turn the ship in tacking, communicated by the helm, which is then put to the lee-side, being announced by the pilot, or commanding officer, who then calls out, Helm's a-lee! the head-sails are immediately made to hiver in the wind, by casting loose their sheets or bowlines. The pilot then calls, Up tacks and flaps! which is executed by loosening all the ropes which confine the corners of the lower sails, in order that they may be more readily shifted to the other side. When the ship has turned her head directly to windward, the pilot gives the order to turn about the sails on the main and mizen-masts, by the exclamation, Haul main-fall, haul! the bowlines and traces are then instantly cast off on one side, and as expeditiously drawn in on the other side, so as to wheel the yards about their masts; the lower corner of the main-fall is, by means of its tack, pulled down to its fixation at the chefs-tree; and all the after-sails are, at the same time, adjusted to stand upon the other board. Finally, when the ship has fallen off five or six points, the pilot cries, Haul off all! or, let go, and haul! the falls on the fore-mast are wheeled about by their braces; and as the ship has then a tendency to fail off, she is checked by the effort of the helm, which for that purpose is put hard-a-lee. The fore-tacks, or the lower corner of the fore-fall, being fixed in its place, the bowlines are hauled; and the other falls, which have been neglected in the hurry of tacking, are properly arranged to the wind; which exercise is called trimming the sails. Falcoiner.

Tack of a Flag, a line spliced into the eye at the bottom of the tacking, for securing the flag to the halyards.

Tack-Stopper. See Stopper.

Tack, in Rural Economy, a term provincially made use of in some districts, as Gloucestershire, to signify a fort of shelf, within the dairy, for laying cheese upon while they are drying, and afterwards.

Tack, or Tack of Land, in Agriculture, is a word used in some parts of the nation, as those of the north, for the term of a lease. It, in short, denotes the means by which land is held by the farmer, from the proprietor or real owner, in the intention of cultivation and improvement, for the advantages of the producer. It was in its origin a sort of feudal or military tenure of land; accordingly it is found, the writer of the corrected Agricultural Report of the County of Peebles says, that, as military tenants, at first, became tenants for life, from being tenants at will; to the first notion of giving the security of independence to the cultivator of the soil, in Scotland, as elsewhere, was to give him security of possession for life. The life-tenant tack feems, it is said, the first adopted species or kind of tack-holding, rendering the possessor independent, his situation respectable, and his rights and interlfs regarded. Superior privileges were accordingly bestowed upon the life-tenant tack; the property in this tack was, and is, considered to be so complete, as to imply the full power of its alienation, in defiance of the proprietor's supposed essential and inherent right of delectus perfone; and, when granted to a woman, was not considered as forfeited upon her marriage, as implying affiliation contrary to the proprietor's right of delectus, in consequence of its falling under the husband's jus maritum; although such, it is said, is the absurd construction of Scots law, in regard to the effect of a woman's marriage, upon a tack for definite time, to which she would have been extended to this species or kind of tack. As nineteen years may, however, be considered as a favourable exchange for a life-tenant, this, it is thought, probably the reason why the Scots tenant seems to have generally preferred this security; infomuch that the mention of a tack, without specification of the term, in common habit suggested the idea of a nineteen years' lease. The privileges granted to cultivators, by legislating proprietors, seem, it is said, to have been granted slowly, with reluctance, and to no greater extent than what indispensible utility obviously and absolutely required. A short-sighted avarice, it is observed, wished to grasp at the fruits of the cultivation effected by the tenant's flock, as speedily as possible; even so prematurely, as to allow no sufficient security of time for their being effected at all: and the genius of law seems, it is thought, to have been universally inimical, both in modern and in ancient nations, to the long duration of leases, which seemed to keep back the proprietor from reaping the benefit of the increased value of his property. And that, when subsequent views of utility suggested the propriety of tacks of still longer duration, they were ventured upon with timidity, as an extension of a species of tenure, to which the genius of law was unfriendly; which, as yet, she had not recognized to that extent, and which she might be scrupulous in functioning. Such tacks, therefore, it is said, taught shelter under the form of the privileged tack of nineteen years, which had acquired an analogous validity, and whose wholeface influence was thought able to protect them: the whole term meant durat, not, it is said, be avowedly expressed; but the tack was granted for two, or three, or three children's, or three nineteen years, until the number of years proposed should be completed in nineteen.

The tack, though still somewhat loaded and encumbered by a remnant of the shackles and tyranny of the feudal state, as to considerably obstruct and impede the credit and enterprise of agricultural pursuits, yet probably, in conference of the different enactments and decisions since made, empower the holders by it, in the above part of the kingdom, perhaps to enjoy more security, it is thought, than what was ever believed upon the actual cultivators of the soil or land, either in ancient or in modern times. See Tenant and Tenure.

Tackle, in a Ship, a machine formed by the communication
TACKLE

The power of a tackle will be, the friction not considered, as the number of parts of the fall that are applied to sustain the weight. If a tackle consists of a double and a single block, and the weight to be hoisted is hung to the double block, there will be four parts of the fall; and the weight reeling upon four ropes, equally stretched, each must bear the same part of the weight. Thus, suppose the weight hung to the double block be four hundred, then one hundred applied to the fall or hauling part will suspend it; and if as much power be applied as will overcome the friction, it will purchase the weight: but had the weight been hoisted to the single block, it would have reeled on three ropes only, each of which would bear a third part of the weight; therefore, a third part of the weight being applied to the hoisting part of the fall, would suspend the weight, when hooked to the single block; as much more being applied as will overcome the friction, would purchase the weight.

The blocks that are fixed are only for the convenience of turning the direction of the fall; they add nothing to the power of the purchase, but, on the contrary, destroy so much as is necessary to overcome their friction, and are, therefore, to be avoided as much as possible.

Ropes, if tight laid, will not easily bend round small sheaves, but will take up a considerable part of the power to force them into their proper direction: hence it follows, that blocks with small pins, large sheaves, and slack-laid ropes, are the belt materials to obviate friction, and make tackles with more ease.

The anchor-block tackle is composed of a double block and a single block, strapped, with a hook and thimble. Boom tackles are composed of double and single blocks, strapped, with tails, and are used in getting the tacking-fall-booms in or out. Bowline tackle is composed of a long tackle, and a single block, strapped, with a hook and thimble; it is used to bow up the main-bowline, when the ship is upon a wind. Burton tackles are composed of double and single blocks, and are used with pendants, to let up the shrouds, support the topfall-yards, &c. (See Burton.) A flró tackle is composed of a long tackle, and a single block, strapped, with eyes, and is used with a pendant, to fish the anchor, and get it into its place. Garnet tackle is composed of a double block and a single block, strapped, with a hook and thimble; it is hooked to the forecastle-flay in merchant-ships, and is used to hoist goods, &c. in or out. (See Garnet.) Jigger tackles are composed of double and single blocks, strapped, with tails, and are used for topping the main and fore-yards by the lifts, &c. (See Jigger.) Luff tackles are composed of double and single blocks, strapped, with a hook and thimble, and are used occasionally at any part of the ship. Outbailer tackle is composed of two single blocks, strapped, with tails, and is used to bow out the jib-boom. Port tackles are com-

posed of a single block, attached to a span made fast to the side of the port-lid, and a runner with two single blocks, all of which are made fast to the side of the beam near the port, and are used to hoist and lower the port-lids. Quarter tackles are composed of double and single blocks, strapped, with eyes, and lashed to the outer quarter of the yard and the lower block, with a hook and thimble: they are used to hoist up water and provisions. Reef tackles are composed of two double or two single blocks: one block is spliced into a pendant, and the other is strapped, with an eye; they are used to draw the extremities of the reefs close up to the yard-arms for reefing the sail. (See Reef.) Relieving tackles are luff tackles, used at the fore end of the tiller, when the tiller-ropes are damaged. (See Relieving Tackle.) Ridge tackle is composed of a double block, and a single block, strapped, with an eye, and is used to suspend the awning in the middle. Rolling tackles are luff tackles, used to the topfall-yards, to support them under a press of sail, and preserve the parrels. Runner tackles are composed of double and single blocks, and a pendant; the lower block is strapped, with a hook and thimble: they are used to set up the shrouds, and to get the main-heads forward, for lowering the masts. Stay tackles, main and fore, are composed of double and single blocks, strapped, with hooks and thimbles, except the block spliced into the pendant: they are used for getting the provisions, &c. out of the fore and main hold, and for getting the boats in or out. The pendant formerly travelled on the flay, by iron thimbles; but this has been discontinued in the navy, as they much injured the flay by the friction. Stay-fall-flay tackles are composed of double and single blocks; the lower blocks are strapped, with a hook and thimble: they are used to set up the jib, and other flay-fall-flays. Shifting back-flay tackles are composed of double and single blocks, strapped, with a hook and thimble, and are used to set up the shifting back-flays, where wanted. Topmast-flay and preventer-flay tackles are composed of long tackle blocks and single blocks; the lower blocks are strapped, with a hook and thimble: they are used to set the topmasts and preventers flays. Fore-top-gallant-flay tackle is composed of a double and single block, and is used to set up the fore-top-gallant-flay. Tack tackle is composed of a double and single block, strapped, with hooks and thimbles, and is used for lowering the tack of fore and aft main-falls. The top tackle is composed of double or treble blocks: it is attached to the top-ropen pendant, and is used to erect the topmasts, at the heads of the lower masts. Truss tackles are composed of two double blocks, strapped, with hooks and thimbles, and are used to secure the lower yards to their masts, being hooked to the truss-panald. Winning tackle is composed of a forefold and a treble block, or a treble and a double block, strapped, with eyes; it is attached to the winning-tackle-panald, and is chiefly used to get in and out the guns. (See Plate II. Rigging, fig. 17.) Yard tackles are composed of double and single blocks; the double blocks are spliced into the lower ends of the pendents, and the single blocks are strapped, with hooks and thimbles; they are used to hoist the boats in or out.

Tackle-Flay, that end of the rope of a tackle which is bowed on, or the rope which composes the tackle.

Tackle, Gunner's, that which serves to hoist the ordnance in or out.

Tackle Pendants. See Pendant.
TAC

Tackle, Tack, is a small tackle used occasionally to pull down the tack of the principal sail of a ship to their respective furlings. There is also a tackle of this kind constantly fixed to the tacks of the main-sail in brigs, sloops, and schooners, for the same purpose. Falconer.

TACKRAMAH, in Geography, a town of Africa, on the Gold Coast. N. lat. 4° 52'. W. long. 3° 10'.

TACKSMAN, in Agriculture, the tenant or perfon who holds or takes a tack of land of another. In subletting, the original person of this kind is, it is said, by the writer of the Peebles Corrected Agricultural Report, considered as bound to the proprietor, as well as the sub-tenant; whilst, in allignment, the original tenant is free, subtilting the other in his place. In conformity to the analogy of the feudal law, therefore, it is said, as well as to the greater security of the proprietor, the Scottish law is considered as more favourable to sublet, than to allignement; because, in sublet, the first tenant does not relinquish his position as a quafi vassal, and the purposes of the metaphorical deleetus may be, thus, considered as metaphorically, or analogically fulfilled by this fictio juris, or quafi: moreover, too, the security of the proprietor, so far from being weakened, is greatly strengthened, in having his right of hypothec unimpaired, and the security of two instead of one. Upon this principle, it was considered, it is said, by the Scottish law, Erkine, that a power of sublet was implied, in all cases where the contrary was not directly expressed; until the decision, in 1791, came to rectify the misconceptions of the people, when it was decided, that, in a tack of nineteen years, it was implied, in law construction, without any formal stipulation in the lease to that effect, that the power of deleetus was retained; and that the tack was neither assignable nor sublettable.

But even Erkine allows, it is said, that, upon legal principles, an express stipulation in the tack against allignees, both legal and voluntary, would prevent the tack from being evicted by the tenant's creditors: otherwise a tack, unassignable by the tenant's voluntary deed, would, according to him, be evitable by adjudication, at the instance of the tenant's creditors: but even in that case, the creditors would be guilty of Leer-magefl towards the faered right of the deleetus: they must to the reversion of the lease to a fair fale to the bell bidder: they are debared, therefore, it is said, from such unshallowed and irreverent measures; they can only enter upon admistration, as responsible factors of the tenant's concerns.

TACKUMREET, in Geography, a town of Africa, or, as it may be rather denominated, the ruins of an ancient town called "Siiga," or "Sigem," once the metropolis of Mauritania, situated on the coast of the Mediterranean, at the mouth of the river Tafna; 44 miles S.W. of Orao. N. lat. 35° 30'. W. long. 5° 55'.

TACKYSERAI, a town of Hindostan, in Oude; 35 miles W. of Lucknow.

TACLAOUR, a town of Thibet. N. lat. 38° 5'. E. long. 80° 57'.

TACOLA IMPERIUM, in Ancient Geography, a port on the western coast of India, on this side of the Ganges: and now Junktylon.

TACOMA, in Geography, a town of Mexico; 16 miles N. of Mexico.

TACOMAR-TREE, a name by which some authors call the fugar-cane.

TACO MOUNTAIN, in Geography, a mountain of America, in Massachusetts, S. of Great Barrington.

TA-CONG-TO-CHE, a town of the island of Formosa. N. lat. 22° 22'. E. long. 120° 4'.

Vol. XXXV.

TACSABI RNAX, in Geography, a lake of Thibet, about 36 miles in circumference. N. lat. 32°, E. long. 88° 34’.

TACSANLUG, a town of Asiatic Turkey, in Natolia; 23 miles N.N.W. of Kuitajah.

TACSONIA, in Botany, Juff. 378, a name of Peruvian origin, given by that author to such species of Pasionflower, as have a tubular elongation of the base of their calyx. See Passiflora.

TACTICS, TACTICA, formed from τακτική, order; the art of disposing forces in form of battle, and of performing the military or naval motions and evolutions. The science of tactics is either military or naval.

Tactics, Military, comprehend great or general tactics, la grande tactique of the French writers, which includes every thing that relates to the order, disposition, and formation of armies, their encampment, and every other circumstance pertaining to forces, baggage, &c.; and also particular or subordinate tactics, more immediately comprising their movements and evolutions. With the former every general officer ought to be thoroughly acquainted; whilst the latter should be well understood by inferior officers and fielders, and cannot be totally disregarded by those of the former description.

The Greeks were very skilful in this part of the military art; having public professors of it, called τακτικοί, who taught and instructed their youth therein. We have an account of the progress of this art among them in Thucydides, Xenophon, and Polybius. Τιλιχω νόμος hath a particular book on this subject; and there is a great deal of it in Arrian, in his History of Alex. M. and in Mauritius, and Leo Imperator.

From the Greeks this art was transmitted to the Romans, among whom it arrived at its highest perfection. Vegetius has given us a compilation and abridgment of authors who have written on this subject; and his work contributed in a considerable degree to the establishment of military discipline in Europe; for which we are greatly indebted to Maurice, prince of Orange, Alexander Farnefe, duke of Parma, Corligny, Henry IV. Gustavius Adolphus, &c.

Vollius, De Scient. Mathematica mentions twenty-four ancient authors on the subject of tactics.

It does not appear what was the field-exercise of the infantry in our ancient armies. After the Revolution, our system of discipline was chiefly taken from the Dutch, who, under prince Maurice, were the best regulated troops in Europe. Previously to this, the Spaniards were reckoned to have the best disciplined infantry. The exercitio was, at the commencement of the last century, and for many years afterwards, encumbered with a number of unceles motions. The manner in which the folders were armed, with their heavy muskets, bandoliers, &c. obliged them to make wide motions, and to draw up with very extended ranks and files. For an account of the exercitio and evolutions of the infantry and cavalry at this period, we refer to Grofe’s Military Antiquities, vol. 1. Of late, great alterations have taken place in the field-exercise and manoeuvres both of the cavalry and the infantry. Molt of the dragon regiments have been made light; and a new sword-exercise has been adopted for the cavalry. The whole system of the army has been rendered uniform, by regulations ifiued from the adjutant-general’s office. Within the last 60 or 70 years, the British infantry has been gradually falling into the Prussian system; and the new regulations are almost wholly founded on the Prussian institution. For the particulars, the reader is referred to the “Rules and Regulations for the Formation, Field-exercise, and Movements of his Majesty’s Forces,” and the articles Manual Exercize and Battalion.

The subject of this article has been already discussed under the following heads: viz. ARMY, BATTALION, BATTLE, ORDER OF BATTLE, CAMP, CAMPANIA, CASTRATIONETATION, COLUMN, ENGAGEMENT, EVOLUTION, EXERCISE, LINE, PHALANX, in which order the Gauls and other nations fought in the time of the Romans, and which order still prevails, under some disadvantages, throughout Europe; WAR, &c. &c.; so that we have here little to add.

We shall here observe, that the principal object of the Prussian tactics under Frederick the Great was that of concentrating forces, and attacking the chief points of the enemy, not at one time, but one after another; whereas the tactics which have been uniformly pursued by the French, since the commencement of their revolution, have been founded on the principle of attacking all points with divided forces at the same time; thus extending their force, whilst that of the Prussians was compressed.

Tactics, Naval or Maritime, comprehend the orders and signals which are directed to be observed by fleets preparing for action or actually engaged, together with the manœuvres and modes of attack that are then to be practiced, and also a knowledge of the rates of ships, their various appendages, and the mode of constructing them. Of this branch of tactics, a copious account will be found under several articles, particularly BATTLE, ENGAGEMENT, EXERCISE, and LINE OF BATTLE, under which last article we have referred to Clerk’s (not Clarke’s) Essay on Naval Tactics, of which a second edition was published in 1804, which those who are devoid of information on the various modes of attack to windward and leeward, and by cutting the line, will consult; but which does not admit of abridgment within the limits that we are under the necessity of prefcribing to ourselves.

Tactics is also used for the art of inventing and making machines for throwing of darts, arrows, stones, fire-balls, &c. by means of flings, bows, and counterpoises. Vegetius, Hiero, &c., have written on these machines; and we have them described and figured by Lipinus.

TACTILE, or TANGIBLE, in the Schools, something that may fall under the folds of feeling.

Though atoms be corporeal, yet are they not either tactile or visible, by reason of their smallness.

The principal tangible qualities are, heat, cold, dryness, hardness, and humidity. See HEAT, &c.

TACTION. See FEELING.

TACON, in Geometry. See TANGENT.

TACTUS, the Touch, in Midwifery, is the exploration of the state of the vagina and uterus, and of the situation of the fetus, and whatever else is contained in it. Hippocrates, in his Treatise on the Diseases of Women, has been very full and exact in his directions upon this subject.

TACTUS, Tact, in Music, before the use of bars, implied nearly the same thing as a bar: that is, the time when the hand or foot is beaten down in marking the measure. Tutte, Ital., the same.

TACUA,
TADUA, in Ancient Geography, a river of Italy, in Liguria, E. of Rutuba.

TACUA, in Geography, a town of Peru, in the diocese of Arquep; 20 miles E. of Arica.

TACUBA, a town of Mexico, N.W. of the city of Mexico.

TACUMADARS, or Tigumeden, a town of Africa, in the country of Darab, the original country of the reigning thers of Morocco.

TACZLI, a river of European Turkey, which runs into the Danube, near Kilia, in Bessarabia.

TADAPOLY, a town of Hindooftan, in Mykre; 5 miles S.E. of Sattimungabum.

TADCASTER, a market-town in the West Riding of the county of York, England, is nine miles S.W. from the city of York, and 190 miles N. of London. In the year 1811, it contained 382 houses, and 1483 inhabitants. The name of this place implies a Roman station, and accordingly we find, that the Calcaria of Antoninus was situated on the course of a Roman road, between Eboracum or York, and Mancunium or Manchester, at nine miles distance from the former; and this agrees with the site of the present town. Dodworth and some other antiquaries, however, place the Calcaria at Newton-Kyne, about a mile and a half W. of Tadcaster. Horley in "Britannia Romana," and Drake in "Eboracum," are decisive in fixing the Roman station at Tadcaster. It appears that many Roman coins have been found here: some banks and ditches surround the town, and on the south side of the river are remains of intrenchments, called the Castle. A considerable quantity of stone was taken from this fortress to build a bridge over the river Wharf at the beginning of the 18th century. This bridge is generally described as a very fine structure; and its centre marks the union of the West Riding of the county, with the Ainsty of York and liberty of St. Peter. Tadcaster has a weekly market on Wednesdays, and four annual fairs.

Tadcaster and its vicinity have been twice distinguished and annoyed by the destructive effects of civil warfare: first in the conflicts between the houses of York and Lancaster: and secondly, between the royalists and the republicans, about the middle of the 17th century. On the former occasion, it is related, that between 30,000 and 40,000 Englishmen fell in deciding the question, whether a tyrant or an idiot should be their master. After Edward IV. had been proclaimed in London, Margaret of Anjou, wife of Henry VI., raised an army, in the north, of about 60,000 men, all attached to the Lancastrian interests. These were assembled at York. When Edward with his army arrived at Pontefract, several skirmishes soon took place on the banks of the Aire, and on Palm-Sunday, 29th March, 1461, the memorable and fatal battle of Towton ensued. On this day it is said, that Henry's army consisted of 60,000 men, and Edward's of about 48,600. These commenced an engagement early in the morning, and fought with great fury during the whole day, with various degrees of success. At length, however, Henry's soldiers fell back, whilst Edward impelled his forward with increased impetuosity. Many of the former were drowned, and several noblemen were slain, whilst Henry and Margaret fled into Scotland. Edward and his followers retired to York, and afterwards went to London, where the new monarch was crowned. In the year 1462 another battle occurred at or near Tadcaster. Sir Thomas Fairfax, with about 700 men, occupied this town in behalf of the Parliament, and were attacked by the royal army under the earl of Newcastle. After fighting a whole day, the former retreated during the night, and left the royalists in possession of the place.

About five miles S.E. of Tadcaster is Scarthingwells-Hall, the seat of lord Hawke, who has paid particular attention to agricultural improvements; and has fitted up a farm with every convenient and useful accommodation. (See Agricultural Survey of the West Riding of the County of York.) Three miles south of the town is Hallewood-Hall, the seat of the Vavasours, distinguished for the fine-ness of its scenery, and the variety and beauty of the prospects from its grounds. Bramham Park, the seat of James Lane Fox, esq., is about four miles S.W. from Tadcaster.


TADADUL, a town of Hindooftan, in Mykre; 6 miles S.E. of Caveripatam.

TADERI, a town of Hindooftan, in Mykre; 100 miles N.E. of Chittledroog. N. lat. 14° 35'. E. long. 78°.

TADEN, a town of the duchy of Holsteine; 14 miles E. of Meldorp.

TADEPATRY, a town of Hindooftan, in the circum of Cuddapa; 24 miles N. of Gandicotta.

TADIPPOODY, a town of Hindooftan, in Golconda; 20 miles S.E. of Combanet.

TADIVAN, or TADIAN, a town of Persia, in the province of Farifian, situated on a pleasant plain, in the midst of streams, which descend from the neighbouring mountains, and planted with a variety of excellent fruit-trees; 60 miles S. of Schiras.

TADMOR. See Palmyra.

TADORDNA, the Anus tadorna of Linnaeus, in Ornithology, a name given by many authors to a species of duck, called by others subpander, and in English the file-drake, or borough-duck; and by some the bergander. See Duck. It is of a middle size between the duck and goose; its beak is broad, short, and red; and at the origin of the upper chop there is a large red tubercle of flesh; the head and upper part of the neck are of a fine blackish-green, the lower part of the neck white; the breast and upper part of the back surrounded with a broad band of bright orange-bay; the covets of the wings and middle of the back are white; the near end scapulars black, the others white; the great tail-feathers black; the exterior web of the next are of a fine green, and those of the three succeeding orange; the covets of the tail white, and the tail of the fame colour, except the two outmost feathers, which are tipt with black; the belly white, divided lengthways by a black line; the legs are of a pale flesh-colour. They inhabit the sea-coasts, and build in deftored rabbit-holes; but their flesh is not well tasted.

When a person attempts to take their young, they divert their attention by flying along the ground as if wounded, till the brood are secure, and then return and collect them together. Turner, therefore, concludes, that this bird is the chenadoplex, or fox-goose of the ancients; and the natives of the Orkeynds at this day call it the fly-goose.

These birds lay 15 or 16 white roundish eggs. In winter they collect in large flocks. Ray and Pennant.

TADOUN, or TADIVAN, in Geography, a town of Asiatie Turkey, in Armenia, situated on the west coast of the lake of Van, having a harbour for boats; 200 miles S.E. of Erzerum.

TADOUSAC, a town of Lower Canada, at the mouth of the Saguenay, on the left side of the river St. Lawrence.
The native Indians resort hither to exchange furs for cloth, and other European goods. It was first settled by the French, taken by the English in 1629, retaken by the French in 1633, and it was ceded with the rest of Canada; 100 miles N.E. of Quebec. N. lat. 48° 5'. W. long. 60° 40'.

TADPOLE. The animal called by this name is no other than the frog in its first state from the spawn; and this creature furnishes the curious in microscopic observation with a beautiful view of the circulation of the blood, especially when young.

The method of procuring them for this purpose in the greatest perfection, is this: let a small quantity of frog's spawn be kept for some days in water, and from this will be produced a vast number of young tadpoles: these, while very young, are perfectly transparent, and when placed before the double microscope, the heart may be easily seen, and its pulsation regularly observed; and the blood protracted thence may be beautifully seen circulating through the whole body; but particularly in the tail, whereas, though so very minute, more than fifty vessels may be seen at one view. The young brood grow more and more opaque every hour, and in a day or two the circulation of the blood can only be seen in their tail, or in the fins near the head. Baker's Microscope, p. 126.

TEDA, in Pharmacy, a term used by some authors to expressive certain compositions made up in form of treches. There are sometimes meant as peltries to be introduced into the vagina, and therefore made into this form; sometimes they are compositions of fragrant or other ingredients for infusions.

TEDA, in Botany, a name given by some authors to the pinther, or common wild pine, or mountain-pine.

TAEL. See TALK.

TENARIAS, tamarix, in Antiquity, a festival in honour of Neptune, faminiated Tenarius, from Tenarus, a promontory in Laconia, where he had a temple.

TENARIAS, or Tenarius, now Cape Matapan, in Ancient Geography, a promontory of the Peloponnesus, S. of Laconia, between the gulf of Messenia and that of Laconia. Here were formerly a grotto, and a temple of Neptune, which rendered the place very famous, so that it was reckoned to be one of the mouths of hell, through which Hercules and Pythe destroyed a ship. The temple was accounted an inviolable sanctuary. On this promontory there were also a statue of Arion, seated on a dolphin, and playing on the lyre, and a fountain of wonderful efficacy.

TENARIUM, a town of the Peloponnesus, upon the promontory above described.

TENARIUM Marmor, the name of a marble used by the ancient architects and statuaries. There were two kinds of it, very different in colour, but perfectly agreeing in hardness, and in the high polish they are capable of. The first, or most frequent kind, was black, and was dug from the promontory called Tenarius, in the Lacedamonian flate; the other, which was more scarce, and much more beautiful, was of a green colour, with a cast of yellow: this was dug in the Tagetan quarries, and was called by some marmor herfolium, and xenon.

TENIA, or Tenia, in Architecture, a member of the Doric architrave, resembling a square fillet, or reglet; and serving in lieu of a cymatium.

The word is Greek, tenos, which literally denotes a fawth, bagadex, fillet, or the like. Barbo renders it by fillet; but Palladio uses the old name tenia.

Leon Baptista Alberti calls the tenia, regula, and sif-

TENDA; and Daviler, bandelet. Philander says, there are two kinds, viz. that above-mentioned, which he calls the lower; and an upper, which serves for a capital to the triglyphs.

TENIA, in Ichthyology, the name of a fish of the anguilliform, or eel-shaped kind, common in the Mediterranean sea, and brought to market in Italy and elsewhere. This is a species of cepola in the Linnean system. See CEPOLA.

TENIA Cornuta, a horned tenia, a name given by many authors to the species of cobitis, named by Artedi, the cobitis with a forked prickle placed under each eye. This fish is the cobitis tenia of Linneus. See CORBITIS.

TENIA, in Zoology, a genus of the Ichthiina order of worms; the characters of which are, that the body is flat and articulated, and that the head is furnished with four sucking bladders. Gmelin, in his edition of the Linnean system, enumerates eighty-six species, besides several varieties. Their habitations are the viscera of men and of different animals. Our limits will not allow us to specify and describe them. For an account of the tenia intellimus between the human body, or Limbricus latus, we refer to TAPE-WORM.

TENIOLONGA, in Ancient Geography, a town of Africa, in Mauritania Tingitana, upon the Iberian sea. Port.

TENITIS, in Botany, from tenia, a ribband, or fillet, because of the long narrow shape of the frond.——Swartz Fil. 24. Willd. Sp. Pl. v. 5. 15.——Clas and order, Cryptogamia Filiceae. Nat. Ord. Filiceae.

Ell. Ch. Sorus linear, nearly uninterrupted, longitudinal, between the rib and outer margin of the frond. Involutarium none.

1. T. blechnoides. Pinnata Tape-fern. Swartz Fil. 220. Willd. n. 1. ("T. percoidei; Schkuhri Crypt. 21. t. 6." Sprengel Crypt. 441. t. 10. f. 106. Petris blechnoides; Willd. Phyto gr. 13. t. 9. f. 2.)—Frond pinnate; leaflets linear-lanceolate, tapering at each end, entire, smooth.—Native of the East Indies. The whole frond is from eighteen to twenty-four inches, or more in height, smooth, with a smooth, furrowed, bluntly angular fiall. Leaflets opposite, the lower ones occasionally alternate, five or five pairs, equal, about five inches long, and half an inch wide in the middle. Line of strictification on each side of the mid-rib, about half way between it and the margin. We must rely on the authors cited as to the abecdon of an involucrum. See Sorus.

2. T. fuscata. Forked Tape-fern. Willd. n. 2. (Petris fuscata; Linn. Sp. Pl. 1531. Swartz Fil. 95. Lingua cervina fuscata; Plum. Fil. 122. t. 141. Phyllitis alpers, furcis lineatris; Petiv. Fil. n. 125. t. 6. f. 1.)—Frond himple, repeatedly forked, linear-lanceolate, acute, wavy; feby beneath.—Gathered by Plummer in the woods of Hifpaniola. No other botanist appears to have even seen a specimen. The root is tufted, feby, bearing several fronds about a foot high, leafy to the very base, one or twice forked, and rather spreading, of a very thin membranous texture; of a fine green, and very smooth, in front; paler at the back, clothed with reddish pointed scales, and furnished with a black shining rib. The strictification is flattened in a forus, or line, two or three inches long, on each side of the rib, but nearer the margin, in the upper part of each very acute lobe of the frond, the margin in that part being even, not wavy. The want of an involucrum is only pronounced from Plummer's figure, nor do we effume the generic character, of this species at least, to be very certain.

Dr. Swartz hints at another possible species, the Blechnum ferniculatum, Willd. Phyto gr. 13. t. 8. f. 2. But if it be fo, the
the genus can have little pretensions to be esteemed natural; and as Willdenow himself has not subsequendy followed this hint, we presume he thought it unauthorized by his own specimen, which has the aspect of a confluent Grammitis.

TAENSIAPA, in Geography, a river of West Florida, which runs into the Ibberville, N. lat. 30° 19'. W. long. 10° 12'.

TAFALE, a river of Africa, which runs into the sea, between the rivers Senegal and Nunez.

TAFALISGA, a town of Africa, in the kingdom of Jaaga, at the union of the Falema with the Senegel. N. lat. 14° 42'. W. long. 10° 12'.

TAFALLA, a town of Spain, in Navarre, honoured with the name of city by Philip IV. It has an university; 15 miles S. of Pamplona. N. lat. 42° 35'. W. long. 1° 43'.

TAFARA, a town of Africa, in the kingdom of Bamburra, on the Niger; 115 miles S.W. of Segou.

TAFEELALATI, a town of Africa, in Sahara; 200 miles S. of Tombuctoo. N. lat. 19° 40'. E. long. 2° 15'.

TAFELBERG, a town on the E. coast of the island of Ceram. S. lat. 3° 20'. E. long. 15° 16'.

TAFELICHTE, a mountain on the borders of Lufatia, 3540 feet above the level of the sea.

TAFAREL, or TAFRAIL, in Ship-Building, the upper part of a ship's stern, usually ornamented with carved work, or mouldings, the ends of which unite with the quarter-pieces.

TAFAROWY, in Geography, a mountain of Algiers; 13 miles S.E. of Oran.

TAFETY, or TAFATY, in Commerce, a kind of fine, smooth, silken stuff; having, usually, a remarkable luster, or gloss.

1. Alamedo, is the taffetas noir of Lyons.

2. Lather, is the taffetas noir of the French, or our alamedo.

3. No lather is our lathering.

There are tafettes of all colours; some plain, others striped with gold, silver, silk, &c. others chequered, others flowered, others in the Chinese point, others the Hungarian; with various others to which the mode, or the caprice of the workmen, gives such fanciful names, that it would be as difficult, as it is useless, to rehearse them: besides, that they seldom hold beyond the year in which they first rose. The old names of taffeties, and which still subsist, are; taffeties of Lyons, of Spain, of England, of Florence, of Avignon, &c.

The chief consumption of taffeties is in the hammer-dresses for women, in gowns, linings, window-curtains, &c.

There are three things which contribute chiefly to the perfection of taffeties, viz. the silk, the water, and the fire. The silk is not only to be of the finest kind, but it must be worked a long time, and very much before it be used: the watering is only to be given very lightly, and seems only intended to give that fine luster, by a peculiar property not found in all: lastly, the fire, which is passed under it to dry the water, has its particular manner of application, on which the perfection of the stuff depends very much.

Octavio May, of Lyons, is held the first founder of the manufacture of glossy taffeties; and tradition tells us the occasion of it. Octavio, it seems, going backwards in the world, and not able to retrieve himself by the manufacture of taffeties, such as were then made, was one day musing on his misfortunes, and, in musing, chance to chew a few hairs of silk which he had in his mouth: his reverie being over, the silk he spit out seemed to shine, and, on that account, engaged his attention. He was soon led to reflect on the reason; and, after a good deal of thought, concluded, that the luster of that silk must come, 1. From his having pressed it between his teeth. 2. From his having wetted it with his saliva, which had something glutinous in it. And, 3. From its having been heated by the natural warmth of his mouth. All this he executed upon the next taffeties he made, and immediately acquired in undue riches to himself, and to the city of Lyons the reputation it still maintains, of giving the gloss to taffeties better than any other city in the world.

It will not, we conceive, be less useful than curious, to insert here the description of the engine contrived by Octavio to give the glow to taffety; and to add the manner of applying it, and the composition of the water used in it.

The machine is much like a silk-loom, except that, instead of iron points, there is used a kind of crooked needles, to prevent the taffety from slipping; at the two extremities are two beams, one on which is rolled the taffety to take the glow; and on the other, the same taffety, as fast as it has received it. The first beam is kept firm by a weight of about two hundred pounds, and the other turned by means of a little lever passing through mortises at each end. The more the taffety is stretched, the greater luster it takes: care, however, is to be used that it be not weakened by over-stretching.

Besides this instrument for keeping the stuff stretched, there is another to give it the fire: this is a kind of carriage, in form of a long square, and of the breadth of the taffeties, it moves on trundles, and carries a charcoal fire under the taffety, at the distance of about half a foot.

These two machines prepared, and the taffety mounted, the stuff is given it by rubbing it gently with a ball, or a handful of bits of fine cloth, as it rolls from one beam to the other; the fire, at the same time, being carried underneath it to dry it. As soon as the piece has its luster, it is put on new beams to be stretched a day or two, and the other this last preparation is repeated, the more it increases the glow.

For black taffeties, the science is given with double beer and orange or lemon-juice; but this stuff is the least proper, as being apt to whiten them. The proportion of the two liquors is, a gallon of orange-juice to a pint of beer, to be boiled together to the consistency of a rich broth. For coloured taffeties, they use gourd-water distilled in an alembic.

There are also several different sorts of taffeties manufactured in China; as corded taffeties, which wear well; and also some with flowers, and others beautifully striped; and a particular taffety, of which they make carriages, and other kinds of wearing apparel. This stuff is thick, and yet so pliant, that it may be folded and pressed with the hand, without losing the luster it makes.

Andrea, in Biography, was one of those early metters to whom the revival of the arts in Italy is attributed. His first ... and died there at the age of 81.

TAFILET, in Geography, a district, formerly a kingdom of Africa, in the empire of Morocco, and _country_
country of Biledulgerid, extending along the east side of mount Atlas; the habitations of which are about 1,500 feated houses, and of these several are defended by a tower, and each of them stands amidst an inclosure of gardens, cultivated grounds, and plantations of palm-trees, forming a variegated and pleasant country, intersected by many rivers and rivulets, descending from the eait of mount Atlas, and serving to water their lands. Tafihelt, as well as Draha, produces a superior breed of goats, and a great abundance of dates, which are small, but good, constituting the wealth of the country, and supplying food for the people, and even for the cattle. Although the Koran prohibits the use of spirituous liquors, yet by ancient custom, brandy is made at Tafihelt of dates, which is very strong, and drank to immediately by the thiefs, that wine produces no effect upon them. Most of these thiefs are poor, and employ themselves in their grounds and gardens, and very frequently pillage one another. The countries situated near the banks of the rivers of Draha and Tafihelt have several plantations of Indian corn, rice, and indigo. The town of Tafihelt, after which the kingdom was named under the thiefs of the reigning house, is not an ancient city. It derives its name from the word "Felleh," which denominates the inhabitants of the country, and also the fluffs and carpets which are here manufactured. The foil of the extensive plain on which it is situated is a whitish clay, which when moistened resembles soap; and though it pales a river that rises in the Atlas, and pursues a course from the S.W. to the N.E., being at Tafihelt about as wide as the Thames at Putney, its water, traversing the saline plains, is brackish; after a course of about 450 miles, it is absorbed in the desert of Angad. It has several cattles of terrace on its banks, inhabited by the thiefs or princes of the reigning family of Morocco. Wheat and barley have been lately cultivated near the river and the cattles. Another river of inferior note rises in the plains N. of Tafihelt, and flowing in a southerly direction, is absorbed in the Great Defert or Sahara. The water of this river is also brackish, and unfit for culinary purpoxes. The inhabitants of this country, it is said, polishes such a fence of honour, that a robbery is scarcely known among them, though they use no locks. Commercial transactions are carried on amongst them by barter or exchange, so that they have little specie; but in all transactions of magnitude, gold-dust is the circulating medium. They live in the simple patriarchal manner of the Arabs, differing from them only in having walled habitations, which are invariably near the river. The climate during a great part of the year is intensely hot, and the climate, or hot wind from Sahara, blowing tempestuously in July, August, and September, and carrying with it particles of earth and sand, is very pernicious to the eyes of the inhabitants. A considerable trade is carried on from Tafihelt to Tombuctoo, Houlia, and Jinnie, S. of Sahara, and allo to Morocco, Fez, Sufe, Algiers, Tunis, and Tripoli. Indigo abounds, but by reason of the indolence of the cultivators, it is of inferior quality. Here are also mines of antiquity and lead-ore. The common dress consists of a loose shirt of blue cotton, with a flawl or belt round the waist. A caravan pales annually from hence to Tombuctoo. Woollen haiks, of a curious texture, being light and fine, are manufactured here. The Tafihelt goats are very prolific, and afford a rich milk in great abundance; and therefore they constitute an article of considerable export. The Tafihelt leather is very soft and fine, and much superior to that of Morocco; it is as soft and pliable as flilk, and impervious to water. The tanners use the leaves of a shrub called tèzra, which grows in the Atlas mountains, to which some have ascribed the peculiar quality of the leather; though others ascribe it to some quality in the air and water. The population of the district of Tafihelt is stated by Mr. Jackson at 650,000. The town is 140 miles E.S.E. of Morocco. N. lat. 31° 20', W. long. 6°.

**TAFNA**, a river of Algiers, which runs into the Mediterranean, near Tackumbreet.

**TAFO, or TAFA, a town of Africa, on the Gold Coast.**

TAG, or Tagge, in Rural Economy. See Teg.

Tag, or Teg-Sore, a dicide in sheep, which consists, as stated in a paper in the third volume of "The Transactions of the Highland Society of Scotland," of scabs and sores situated on the under side of the tail; arising, in warm weather, from its being fouled with purging and other discharges. The matter hardens there, irritates the tender veins, and produces sores, which, if not attended to, run into mortification, and prove fatal, as in the legs. See Swelling or Leg-Evil.

It is thown by the sheep turning frequently round to bite the tail.

As this complaint arises principally from purging, and the sores are caused by it, &c., the first thing to be done is the restraining and cure of this evacuation: after which the tail of the animal is to be clipped, and the fore part laid bare, washed carefully with milk and water, blood-warm, and then with fine-water. The sheep is then to be turned out into a dry pasture, and looked at again in two or three days, and if not then well, the walking must be repeated, and the parts anointed with grea and tar mixed together in equal proportions.

**TAGABONA, in Geography, a river of Weil Florida, which runs into the St. Mark, N. lat. 30° 22', W. long. 84° 34'.**

**TAGADEMPT, TAGADEONT, or Tegament, a town of Algiers, anciently called Vaga; 60 miles E.S.E. of Oran.**

**TAG/E, in Ancient Geography, a town of Asfa, in Parthia, near the river Ouxis, and on the confines of Hyrcania.**

**TAGAI, in Geography, a town of Ruffia, in the government of Simbirik; 48 miles W. of Simbirik. N. lat. 54° 20', E. long. 47'.**

**TAGAI, a town of the island of Java, on the N. coast, the residence of a Dutch agent for the purchase of rice; 35 miles E. of Cheribon.**

**TAGAL, Tā-Gaļa, or Gala language, is among the Philippines what the Malay is in the Malay islands, or the Hindoofta in Hindooftaish Proper. It polishes the combined advantages of the four principal languages in the world: it is myserious as the Hebrew; it has articles for nouns, both appellative and proper, like the Greek; it is elegant and copious as the Latin; and equal to the Italian, as the language of compliment or buftefs. This language has been cultivated only by the Spanish missionaries. The Tagala grammar of Fra. Galpar de San Augustin, was printed in 1705, and again in 1787. The alphabet consists of seventeen letters, three of which are vowels, and fourteen consonants. The Tagala characters are said to have been derived from the Malay, and they are read with as much difficulty as the eafe with which they are written. This Tagala is written with an iron styile on bamboo and palm-leaves, and the Spanish missionaries assert, that the ancient mode of writing was from top to bottom, like the Chinese. This language, with a considerable number of peculiar vocables, and great singularity of idiom, is nevertheless to be considered as a cognate language with Malay, Bajus, and Javanese. Few languages, on a cursory examination, present a greater appearance of originality than the Tagala.
TAG

For a farther account of it, we refer to Dr. Leyden's Essay on the "Languages and Literature of the Indo-Chinese Nations," in the Asiatic Researches, vol. x.

TAGALAZ, in Geography, one of the Fox islands, in the North Pacific ocean. N. lat. 53° 30'. E. long. 18° 26'.

TAGAMA, in Ancient Geography, a town of Africa, in the interior of Libya, upon the bank of the Niger. Ptol.

TAGAMA, in Geography, a country of Africa, in Nijerya. W. of Cafrina.

TAGANROG, a port of Russia, on the Sea of Azof, first built by Peter the Great in 1696; 32 miles W.N.W. of Azof.

TAGANROG is situated upon the cliff of a very lofty promontory, commanding an extensive prospect of the Sea of Azof, and the whole European coast to the mouths of the Don. The number of inhabitants does not at present exceed 50,000. The mole in the haven is so shallow, that ships performing quarantine lie off at the distance of 10 miles, and all vessels drawing from 9 to 10 feet of water cannot approach nearer to the town than this distance. This town has sunk into decay; and all the belt houses are in its suburbs. If it had water, its situation is very favourable for commerce; but it can be carried on here only for three months in the year. In the winter the sea is frozen. Here are three fairs in the year. The fish caught in great abundance in the sea of Azof is dried and sent over all the south of Russia. Fruit is brought from Turkey, such as figs, raisins, and oranges; Greek wine from the Archipelago, with incense, coffee, silk, thaws, tobacco, and precious stones. Copper of a very inferior quality comes from Trebizond, and is forwarded to Moscow. Among the principal exports are caviare, butter, leather, tallow, corn, fur, canvas, rigging, lines, wool, hemp, and iron. The greatest advantage this town enjoys is its being the depotsof Siberian productions. The Calkums form large settlements in the vicinity of Taganrog. It is the resort of people from a great variety of countries; insomuch that the inhabitants of fifteen different countries have been observed in this place at the same time.

TAGA POLA, a small island among the Philippines; 25 miles W. of the island of Samarc.

TAGARA, an ancient city of India, known to the Greeks about 2050 years ago. Arrian, in his Periplus Maris Erythraei, says that it was a large city, and all kinds of mercantile goods throughout the Deccan were brought hither, and hence conveyed in carts to Barach or Barygaza. Arrian also informs us that Tagara was situated at about 10 days' journey E. of another famous mart, called Plithana, or Pluthana; that Pluthana was 20 days' journey S. of Barach; and that the road to it was through the Bala-gaut mountains. Pluthana, now called Pultana, is situated on the southern bank of the Godavery, about 217 British miles to the southward of Barach. If we divide these 217 miles by 20, the number of days travellers spent in passing from between Pultana and Barach, according to Arrian, we shall have nearly 11 miles per day, or 5 coss, which is the usual rate of travelling with heavy loaded carts. Arrian informs us, that Tagara was about 10 days' journey W. of Pultana. Allowing these 10 days to be equal to about 100 British miles, Tagara, by its bearing and distance from Pultana, falls at Deogohir, or Deogir (which see), a place of great antiquity, and famous through all India, on account of the pagodas of Ekoura. It is now called Dowlatabad, and about four coss N.W. of Aurungabad. It appears in Arrian's Periplus, that on the arrival of the Greeks into the Deccan, above 2000 years ago, Tagara was the metropolis of a large district called Ariaca, which comprehended the great part of the district called Barah, and the southern part of Concun. About the middle of the first century, Tagara was no longer the capital of Ariaca, rajah Salbahman having removed the seat of the empire to Patam. However, the rajahs, headed by Salbahman, having revolted, they gave him battle, and he was slain. Tagara became again the metropolis of Ariaca; at least this was the case towards the latter end of the eleventh century. When the Muffulmans carried their arms into the Deccan, about the year 1325, Tagara or Deoghir was still the residence of a powerful rajah, and remained so till the time of Shah Jahan, when the district belonging to it became a fubah of the Mogul empire. Thus Tagara was deserted, and Kerkhi, four coss S.E. of it, became the capital, now called Aurungabad. Thus the ancient kingdom or rajahship of Tagara was destroyed, after it had existed, with little interruption, above 2000 years. Asiatic Researches, vol. i.

TAGASA, a town of Fez, fated on a river about three leagues from the Mediterranean; 20 miles W. of Melilla.

TAGASTA, in Ancient Geography, a town of Africa, in Numidia, on the route from Hippone to Cafraca. Anton. Itin.

TAGAVAST, in Geography. See TAGOAST.

TAGAZEE, a town of Africa, on the road from Moutzouk to Agades; 260 miles S. of Moutzouk. N. lat. 23° 32'. E. long. 12° 55'.

TAGAZOUTE, a town of Algiers; 45 miles S.E. of Oran.

TAGEBACHI, an island in the Red sea. N. lat. 25° 2'.

TAGETES, in Botany, a name which Fuchius tells us is applied by Apuleius to the Tanf, but which he himself adopts for a plant, not very different in foliage, now vulgarly called the French, or African, Marygold. He is followed by Dillenius, Linnaeus, and every subsequent writer. De Theis derives the word from Tagen, an Etruscan deity, grandson of Jupiter, and teacher of divination; and supposes the beauty of its flowers may have procured the plant this mythological appellation. Of this intention we can find no traces in the above writers. — Linn. Gen. 430. Schreb. 561. Willd. Sp. Pl. v. 3. 2126. Mart. Mill. Dict. v. 4. Atit. Hort. Kew. v. 5. 88. Tourn. t. 278. Jaff. 182. Lamacl. Illust. t. 684. Garut. t. 172.—Claus and order, Syngenia Polyanthus-superfusia. Nat. Ord. Composte oppositifoliae. Linn. Corymbifera, Jaff.

Gen. Ch. Common calyx perfectly simple, of one leaf, tubular, oblong, with about five teeth, and as many longitudinal angles. Cor. compound, radiant. Florets of the elevated disk numerous, all perfect, tubular, longer than the calyx, erect, cut half way down into five linear segments, villous at the inside: those of the radius five, ligulate, female, longer than those of the disk, their limb almost as broad as long, very obtuse, contracted and downy towards the tube, permanent. Sume, in the perfect florets, Filaments five, capillary, very short; anthers united into a cylindrical tube. Fil. in the perfect florets, German oblong; style thread-shaped, the length of the filaments; stigma divided, slender, reflexed. Peric. none. the calyx remaining unchanged. Sceld. to both kinds of florets, solitary, linear, compressed, rather shorter than the calyx; crowned with five, more or less, crests, pointed, unequal scales. Recept. naked, small, flat.

Obl. In a cultivated state, the two common garden species have usually, from luxuriance, more segments in the calyx,
TAGETES.

calyx, and more florets in the radius, than is natural; one of these luxuriant flowers is what Gartner has delineated. Some more recently discovered species, on the other hand, have naturally but three or four radiant florets.

Eff. Ch. Receptacle naked. Seed-down of several erect pointed scales. Calyx simple, of one leaf, tubular, with five teeth. Florets of the radius five, permanent.


β. T. minor, flore fulvo maculato ; Dill. Elth. 373. t. 279.—Stem spreading. Leaves pinnate; leaflets lanceolate, with hair-pointed auricles. Stalks single-flowered, somewhat swelling upwards.—Native of Mexico, from whence it was brought to the gardens of Europe, about the middle of the sixteenth century, and hence dispersed over other countries, being now, according to Lourcimo, commonly cultivated in Cochinchina, China, and various parts of India. With us it is a tender annual, raised on a hot-bed in spring; and being planted out after midsummer, decorates almost every garden throughout the autumn. Its appellations of French Marygold, and African Flower, are altogether founded in error. The stem is about a foot or 18 inches high, branched and widely spreading. Leaves opposite, of five or six pair of dark green shining leaflets, without an odd one; all gradually smaller downwards. Flowers about two inches in diameter, yellow, with broad lateral stripes, or spots, to each radiant floret, of a peculiarly rich brown. They vary in size and tints, as well as scent, and are generally more or less double. The plant of Dillenius hardly deserves to be ranked as a variety. The herb when bruised is very fetid, acid, and supposing to be poisonous, though too nauseous to be very dangerous. Few flowers are more striking in appearance.

2. T. erecta. African Marygold. Linn. Sp. Pl. 1249. Willd. n. 3. Ait. n. 3. (Flos aphricanus major ; Ger. Em. 749. Caryophyllus major indicus ; Boll. Eyset. xiif. ord.14. t. 2. C. indicus ; Camer. Epit. 406.)—Stem erect. Leaves pinnate; leaflets lanceolate, with hair-pointed auricles. Stalks single-flowered, swelling upwards.—Native of Mexico; introduced into the gardens of Europe about the same time as the foregoing, nor is the epithet of African more correctly applied to one than to the other. The same mode of culture suits both, and both are equally common. This species is much the taller, and grows erect. The leaves are rather paler. Flowers twice as large, of a golden uniform yellow; sometimes orange-coloured. Columna, in his Encyclopaedia, part 2. 47. t. 46, represents a quilled variety, as it is termed, whose radiant florets are funnel-shaped, and another whose florets are all of that sort.

3. T. elongata. Long-stalked American Marygold. Willd. n. 4.—Stem erect, nearly simple. Leaves pinnate; leaflets linear, ferrated at the end; those of the lower leaves wedge-shaped. Stalks single-flowered, elongated, slightly swelling.—Native of South America. Root annual. Stem from three inches to a span high, either simple, or furnished with a branch or two from the bottom. Leaflets of the lower leaves ovato-lanceolate, ferrated at the extremity; those of the upper linear, with a few slightly hair-pointed auricles at the end. Stalk solitary at the top of the stem or branch, and almost as long as the stem itself. Flower deep yellow, agreeing in form and structure with T. patula.

4. T. minuta. Small-flowered Chili Marygold. Linn. Sp. Pl. 1250. Willd. n. 5. Ait. n. 4. (T. multiflora, minuto flore albicante ; Dill. Elth. 374. t. 280.)—Stem erect, densely paniced. Leaves pinnate; leaflets lanceolate, ferrated. Stalks many-flowered, fey.—Native of Chili. Cultivated in Dr. Sherard's garden, before the year 1738. A hardy annual, flowering in autumn, but seldom preferred in collections. The stem is ten or twelve feet high, covered with leaves, which are smaller than those of the first species. The flowers are very small and pale, forming dense, compound, tufted, erect panicled, at the ends of the branches; their flasks clothed with brilly florets. Calyx cylinindrical. Radius of two, three, or four variously lobed florets. This is surely the Chili plant of which Feuille (quoted by Dillenius) describes two varieties, differing in the number of their radiant florets; and which he says is extremely hot in quality. The Indians eat it to warm themselves after their return from fishing.

5. T. caracasana. Long-stalked South American Marygold. Willd. n. 6. (T. peduncularias. Cavan. Leccion. 201. n. 495) — Stem corymbose, ferrated, erect. Leaves pinnate; leaflets lanceolate, ferrated at the end. Stalks elongated, single-flowered, erect. Calyx cylinindrical.—Gathered by Baron Humboldt at the Caracas. Root annual. Stem corymbose at the top. Leaflets linear-lanceolate, ferrated at the end, not fringed. Flowers like those of the next species, on long alternate stalks. Leaflets of the uppermost leaves entire. Willdenow. The plant of Cavanilles was raised in the garden at Madrid, from seeds collected at Cumaná by Bonpland, the companion of the celebrated Humboldt. The stem is described a foot and a half high, ferrated, much branched. Flower-stalksfix inches long, turgid near the calyx, leafy in their lower part. Corolla entirely yellow, with five or eight rays shorter than the following. We find nothing in his account which is not conformable to the plant before us, and should have been glad if we could have adopted his greatly preferable specific name.

6. T. tenuifolia. Fine-leaved Peruvian Marygold. Cavan. Jc. v. 2. 54. t. 169. Willd. n. 7. Ait. n. 5.—Stem panicled. Leaves pinnate; leaflets linear, ferrated; their lower auricles elongated. Stalks alternate, single-flowered. Calyx club-shaped.—Native of Peru. Cavanilles. We have specimens from Mutis. Mr. W. Malcolm is paid in Hort. Kew. To have cultivated this species in 1797, but being a late-flowering annual, greatly inferior in size and beauty to the species of the same genus, it has probably not been preferred. The appearance of the dried specimens is like a flaved T. patula, with more numerous, much smaller, flowers than usual. The calyx abounds with oblong glandular dots, of which traces are likewise found in that species. The corolla is described of a full unpotted yellow.

7. T. elliptica. Oval-leaved Peruvian Marygold.—Stem erect, branched. Leaves pinnate; leaflets elliptical, with shawllike auricles. Stalks single-flowered, with lanceolate bracteas.—Native of Peru. We received a dried specimen from the late abbe Cavanilles, in 1804. The stem has a shrubby appearance, and is much branched, leafy and ferrated. Leaflets scarcely visibly ferrated, pointed, smooth and even; the lower ones of each leaf gradually smaller, and mostly alternate. Flowers rather numerous, not very much smaller than in T. patula when not luxuriant; their partial stalks accompanied by alternate lanceolate bracteas. Calyx marked with scattered, apparently glandular, lines. This is certainly very distinct from all the species we can find described.

Louis Né, near the town of Querétaro, in New Spain. It flowered in the Madrid garden, in October 1796. Root annual. Stems hardly a foot high, round, rather woody, smooth like every other part of the plant. The flonderefs of the leaves, and smallness of the flowers, give this species the appearance of a Pectis or Heterospernum (see those articles); but the calyx is perfectly simple, tubular, with five furrows and five teeth. Florets of the radius two only, whitish and undivided: those of the disk generally five, yellow, scarcely more than four-cleft. Seeds long, compressed, each crowned with two bristles, and two intermediate, notched, unequal scales.

9. T. lucida. Sweet Chili Marygold. Cavan. Ic, v. 3, 35. t. 264. Willd. n. 1. Ait. n. 1. Curt. Mag. t. 745. Andr. Repof. t. 539.—Leaves simple, finely ferrated. Panicle corymbose.—Native of New Spain. Its seeds were brought to England in 1798, by the late marchioness of Bute, along with many other novelties from the gardens of Madrid. The root is perennia, and will endure our ordinary winters, with a slight degree of protection. Stems erect, about two feet high, round, dilated, leafy, smooth; branched in the upper part. Leaves one and a half or two inches long, obovate, on short, broad, combined square, elliptical-oblong, smooth, veiny, full of pellucid dots; their lower ferratures tipped with bristly points, or hairs. Panicle level-topped, many-flowered; its stalks angular, smooth, with linear-lanceolate bracteas. Calyx half an inch long, besprinkled with glandular dots. Flowers of a golden yellow, agreeably scented; their radiant florets generally three, very broad. Seed crowned with from two to five linear-lanceolate unequal scales. The ferratures of the leaves are very incorrectly represented in Cavanilles's plate, where they are made to resemble a fringe of fine hairs, which only belongs to the lower ones, and is not expressed in any of the figures hitherto published.

Tagetes, in Gardening, furnishes plants of the herbaceous annual kind, among which the species mostly cultivated are, the French marygold (T. patula), and the African marygold (T. crecida). The first fort has several varieties, as the pale yellow-flowered, deep yellow-flowered, golden yellow-flowered, crimson-coloured, velvety, variegated crimson and yellow, striped crimson and yellow; each of which has both single and double flowers; and there are the large-flowered, small-flowered, sweet-scented, and the dwarf French marygold.

In the second fort, also, there are varieties; as those with pale yellow or brimstone-coloured flowers, with deep yellow flowers, with orange-coloured flowers; the sweet-scented and the dwarf, &c.; each with single, double, and filiform flowers; the middling African, with orange-coloured flowers, and the sweet-scented African, and perhaps some others.

Method of Culture.—All these plants are increased by seeds, which should be sown in the beginning of April upon a hot-bed; and when the plants appear, they should have plenty of fresh air, and, after they have attained some growth, be transplanted on to another hot-bed, which is arched over by hoops, at the distance of six inches; watering and shading them well till fresh-rooted, being afterwards gradually inured to the open air; and about the beginning of May they may be taken up with balls of earth about their roots, and be planted in pots, to be set out in the courts, yards, &c. about the house, shading them till fresh-rooted, and giving them water occasionally. But the first fort divides and spreads out widely near the ground, in a rambling manner, and requires to be trimmed up at bottom to a single stem, and its branches occasionally, to preserve the head somewhat regular, and within due bounds.

In raising them in the open ground, in case of the default of hot-beds and other conveniences, the seed should not be sown before the beginning of April, when the plants are to be covered and protected in the nights, and in severe weather; and when otherwise, not until the middle or latter end of it, and then in a warm rich situation, either in drills of half an inch in depth, or on the surface, and raked in lightly. After the plants are a few inches high, they should be planted out either finally into the borders and other parts, or, when too small, into nursery-rows for a little time, and then set out where they are to remain.

Two or three plants may be placed nearly together, in patches at five or ten feet distance; and when they show their flowers, so as to judge of their properties, the worst may be cleared away, and one only of the best left to each patch, &c. The same way may be had recourse to in planting in pots, &c.

In the future culture of all these kinds of plants, occasional waterings are necessary, frequently the first and second weeks after planting out, but more seldom afterwards. Those in pots should have it three times in the week continually, and morning and night in very hot weather.

Stakes are requisite to the strong large-headed plants, one to each. They should also be properly trimmed in their side-branches near the bottom, and the too great ramblers, to produce regularity.

However, the second species in particular, and the varieties of it, as they always grow firmly erect, both in stem and branches, require but very little trouble after their final planting out: they afford ornament and variety, among other plants, in the borders, clumps, and other parts of pleasure-grounds, as well as in pots for particular places about the house, among other potted annual plants. The seeds of each species, and their varieties, should be annually saved from the best plants.

All the sorts grow very well and freely in any common garden soil, which is in open exposure, exhibiting a particularly conspicuous autumnal bloom, in long succession; and when properly arranged, and disposed in alemblage with other sorts of plants, afford a highly ornamental variety and effect, in the great diversity of the various forms and colourings of the flowers, in the different sorts and varieties.

In sowing the seed, it should be collected only from the finest and fullest double flowers, when perfectly ripe, keeping that of the different varieties quite distinct. The prime large heads of seed of each sort, after being well dried, may either have the seed heat and rubbed out, or kept in them, putting the whole up into bags, boxes, or drawers, until the period of putting them into the ground. Fresh seed should constantly be sowed every year, as that of more than one year old will seldom grow well.

TAGGAH, in Geography, a town of Africa, in the country of Algiers; 24 miles S.E. of Seteef.

TAGGIA, a town of the Ligurian republic; 4 miles N.E. of St. Remo.

TAGGING. See Shearing.

TAGHAYOOG BAY, in Geography, a bay on the west coast of the island of Paraguay. N. lat. 25° 24'.

TAGHMON, a port-town of the county of Wexford, Ireland, on the road from New Rofs to Wexford, which was a borough before the union, and sent two members to the house of commons. It is 73 miles S. by W. from Dublin, and about 9 W. from Wexford.

TAGIA, a small island in the bay of Gunung-Tellu, on the east coast of Celebes. S. lat. 6° 30'. E. long. 122° 6'.

TAGIABAD, a town of Persia, in the province of Iraq; 15 miles E. of Natens.
TAG

TAGIAH, a river of Algiers, which runs into the Mediterranean, 24 miles E. of Oran.

TAGIDOG, a river of North Wales, which runs into the ALEN, 4 miles N. of Wrexham.

TAGIL, a river of Russia, which runs into the Tura, 48 miles W. of Turinik.

TAGILSKO, VERCHEU, a town of Russia, in the province of Ekaterinburg; 52 miles N. of Ekaterinburg.

TAGILSKO, Nizhne, a town of Russia, in the province of Ekaterinburg; 68 miles N. of Ekaterinburg.

TAGIOURO, a town of Africa, in the country of Tripoli; 10 miles N. of Tripoli.

TAGLACROZZI, of TALICOTUS, GASPADO, in Biography, was born at Bologna in 1546, and practised with celebrity as a physician and surgeon in his native city from the year 1570 to 1599, where he died. The peculiar practice, implied in his name, was that of restoring loft parts by intissue, and this practice he derived from some Neapolitan and Sicilian surgeons. It was founded on the principle, that two raw surfaces of living bodies or parts, attached to each other in close contact, will adhere and mutually transmit the circulating fluids. On this subject he published two treatises: viz. "Epitola ad Hieronymum Mercurial de Naribus, multo ante abscissis, reificiendi," Francesco 1587; and "De Curtorum Chirurgia per Intissuem, Lib. duo, additis Cuts traduecis, Instrumentorum omnium, atque Delegationum, iconibus et tabulis," Venet. 1597, fol. A similar practice has anciently prevailed in India, and is now occasionally adopted after the common practice of amputating the nse; for restoring which, a piece from the skin of the forehead is ingeniously grafted. Modern surgeons have avoided the principle, by bringing over flaps of the adjacent skin, in order to accelerate the healing after amputation, and other operations. Haller.

TAGLACOZZO, in Geography, a town of Naples, in Abruzzo Ultra; 18 miles S.W. of Aquila. N. lat. 45° 2'. E. long. 13° 19'.

TAGLIATO, It., in Mufes, is used for measure, which the French call harri; that is, when the character for common time is thus marked, or , with a perpendicular line drawn through the middle of the C; it implies quick time, in which the notes are played or sung twice as rapidly as in the usual common time; a fermiave being performed like a minim, a minim like a crotchet, a crotchet like a quaver, &c. A breve, double the length of a fermiave, used to fill a bar; whence the terms alla breve. This time is still used in music à capella, and alla Palestrina; in which the notes being chiefly open, and in fugue, musicians usually call a fugue confiding chiefly of fermiaves and minims a cubic fugue. The time, too, when a line is drawn through the C, is called out time.

TAGLIER, in Geography, a small island in the gulf of Venice. N. lat. 43° 10'. E. long. 15° 17'.

TAGLIO, a river of the Ligurian republic, which runs into the Mediterranean, 4 miles E. of St. Remo.

TAGLO BAY, a bay on the south coast of the island of Mindanao. N. lat. 6° 8'. E. long. 125° 40'.

TAGLO Point, a cape on the north-west coast of Mindanao.

TAGNON, a town of France, in the department of the Ardennes; 8 miles S.W. of Rethel.

TAGOAST, TAGOAST, or Tagovasi, a large town of Africa, in the kingdom of Sus; famed by Homer to have been the birthplace of St. Augustine; situated in a fertile country, and defended by a garrison of 400 men; 140 miles S.W. of Morocco.

TAGODAST, a town of Morocco, near the foot of the Atlas; 60 miles N.E. of Morocco.

TAGOLANTE, an island in the East Indian sea, about 10 miles in circumference. N. lat. 2° 18'. E. long. 125° 6'.

TAGOMAGO, a small island in the Mediterranean, near the south-east coast of the island of Livone.

TAGORA, in Ancient Geography, a town of Africa, in Numidia. Ant. Itin.

TAGOURIE, in Geography, a town of Chinefe Tartary, in the province of Ham; 50 miles S.W. of Contantin.

TAGOUZAINA, the towns of Tagagha and Zina, in Algiers, being contiguous, and separated only by a small brook; 50 miles S.W. of Contantin.

TAGSTE-RUSTAN, a mountain of Peria, very much revered to by the Gentoo; 4 miles from Ifpahan.

TAGUessa, a town of Morocco; 120 miles W.N.W. of Morocco.

TAGUA, a town and also district of Africa; 250 miles N.E. of Bornou. N. lat. 19° 10'. E. long. 27° 20'.

TAGUAN, in Zoology. See SCILICUS PTERUIJEA.

TAGULMENMET, in Geography, a town of Algiers; 5 miles S.E. of Mugbygannim.

TAGULO, a town on the south coast of the island of Mindanao. N. lat. 7° 34'. E. long. 124°.

TAGUMADERT, a town of Africa, in the country of Darah; 20 miles S. of Tattah.

TAGURIN, a town on the west coast of the island of Luzon. N. lat. 16° 20'. E. long. 120° 48'.

TAGUS, or Tajo, a river, which rising in the mountains of Molina, that separate the kingdom of Aragon from Old Catalonia, passes by Aranjuez, Toledo, Talavera de la Reyna, crosses Catalonia and Estremadura, and enters Portugal at Montalvo; traversing Estremadura, it passes by Abrantes, Santarem, &c. and runs into the Atlantic about 10 miles below Lisbon. Its current is broken by many cataracts, so that on this account, and also on account of its rocks, it is not navigable far above Lisbon.

TAGYPEEL, a small island in the East Indian sea, near the N.E. coast of Bornoe. N. lat. 6° 29'. E. long. 117° 6'.

TAGZA, a town of Algiers; 12 miles S.E. of Constantine.

TAHA d'Modain, a town of Egypt; 5 miles S.W. of Samalut.

TAHABUCKOO, a town of Thibet; 5 miles N.W. of Jhanfu-Jeung.

TAHAIS, a town of Sweden, in the province of Savolax; 50 miles N.N.W. of Nyklot.

TAHAL, a town of Spain, in the province of Grenada; 8 miles N.N.E. of Puechesa.

TAHATE, a town of Arabia, in Yemen; 12 miles W. of Zebid.

TA-HAEN, a city of China, of the second rank, in Yen-nan; 1130 miles S.W. of Peking. N. lat. 25° 52'. E. long. 101° 50'.

TAHEJ, a town of Hindooftan, in Cutch; 150 miles W. of Ambedabad. N. lat. 23° 16'. E. long. 69° 58'.

TA-HE-KAN, a small island near the coast of China. N. lat. 24° 57'. E. long. 120° 30'.

TAHGHUM, a town of Bengal; 14 miles W. of Koonda.

TAHIAO,
The town where the ancient render has its tail, Zoology, wholly pressed, they are often a foot long. 

TAHE'RIE, a town of Persia, in Farfistan, on the coast of the Persian gulf; 12 miles E.S.E. of Konkum. N. lat. 27° 45'. E. long. 52° 20'.

TAHTA, a town of Egypt, on the Nile; 32 miles S. of Siut. N. lat. 26° 57'. E. long. 31° 22'.

TAHUK, or Tabuk, a town of Arabia, in the province of Nadjjas; 176 miles S.S.E. of Jerusalem.

TAI, a city of China, of the second rank, in Chan-fi; 175 miles W.S.W. of Peking. N. lat. 30° 6'. E. long. 112° 30'.—Allo, a city of China, of the second rank, in Kiang-nan; 22 miles E. of Yang-tehchoe. N. lat. 32° 30'. E. long. 119° 36'.—Allo, a large lake. See TAI-HOO.

T'AI-ARABA, an ancient and noble tribe, the mention of which often occurs in the Roman history. They still continue in possession of the same tract of country which they had in the time of Julian, viz. between Moful, Nifbin, and the Khadour.

TAJACU, or the Sus tajacu of Limneus, in Zoology, the name of an animal common in some parts of America, called by many authors oper nofibrinis, or the milk-boar. (See Sus.) It is of the shape of our hog, but much smaller, and has no tail, and its head is broader, and the snout much less pointed than in our hog; it has two tusks in each jaw, those in the upper jaw pointing down, and hardly apparent when the mouth is shut, the others hid; the neck is short and thick, and the whole body of a grizzly colour, or mixture of black and grey; its body is covered with hairs, much thicker and stronger than our hog's-bristles, something like the bristles of the hedgehog, and like them also variegated with circles of black and white; these are four or five inches long on the back, and gradually diminish to the sides; on the middle of its head, between the ears, it has a sort of crest, made up of black bristles; the belly almost naked; from the shoulders to the breast it is a band of white; its ears are small and erect, and its eyes small; its snout, feet, and hoofs, are just like those of the European hog; but the two posterior or exterior hoofs are longer than in any other of the cloven-footed beasts.

What is most singular, however, in this creature, is a certain gland which he has upon the back, and which has given occasion to fome to say its navel was placed there. This gland is situated on the very ridge of the back near the rump, and is so closely covered with long bristles, that till they are removed by blowing, and keeping them back with the hand, the gland is not to be seen: when these are removed, there seen a spot almost naked, in the middle of which the top of the gland is seen; the lips of this gland usually stand a little way above the fleth, and its aperture eafily admits a large flylus; and this gland, when lightly pressed, fews out a liquid substance of a brownifh-yellow colour, and fcent something like that of mufk or civet. The gland itself is placed between the skin and fleth, and is not wholly covered by its constringing muscle, but only surrounded by it at its bottom.

This animal inhabits the hottest parts of South America, and some of the Antilles; lives in forests, on the mountains, is very fierce, and if wounded, will turn on the hunter. It feeds on fruits and roots, toads and serpents, which it kills with great dexterity. It is reckoned very good food; but unless the dorsal gland be cut out as soon as it is killed, the flesh will be infected by it. The Indians call this animal pequarís, whence its name pecary. Ray and Pennant.

TAJAMENDO, or TAJAMIENTO, in Geography, a river which rises in Friuli, and runs into the gulf of Venice; 10 miles S.S.E. of Concordia.

TAJANJE, a river of Brail, which runs into the Atlantic, S. lat. 27° 35'.

TAJARA, in Ichthyology. See RAIA.

TAIBEH, in Geography. Fortified town in the defert of Syria, having near its gate a fountain of fresh water; 83 miles E.S.E. of Aleppo. N. lat. 35° 10'. E. long. 38° 45'.

TAI-CHAN, a town of Corea; 20 miles W. of Hai-men.

TAIDENT, a town of Africa, in Fezzan; 130 miles S.S.W. of Mourozouk.

TAJE-ELT, a town of Algiers; 35 miles S.S.E. of Bona.

TAIEZA, a town of Croatia; 45 miles E. of Bihaes.

TAIGAREE. See TEGHERI.

TAI-BOO, or TAI, a beautiful lake of China, faid to be near fifty leagues in circumference, dividing the provinces of Kiang-nan and Tche-kiang, and surrounded by a chain of picturesque hills. It supplies Sou-choo-foo, at a small distance from it, with fish, and serves the inhabitants also as a place of public resort and recreation. Many of the pleasure-boats on this lake are rowed by a single female; and the rowers are said to follow more than one profession.

TAIIBI, in Zoology, the name of an American animal, defcribed by Maregrave and other authors, and suppos'd by fome to be only the male of the opopon. The Portuguese in America call it the cachorro de mate, and by the Dutch it is called bofbrate. See Didelphis.

TAJÉOURA, in Geography, a town of Africa, in the kingdom of Adel; 15 miles N.W. of Zeitah.

TAIR, CAUDA, that part of an animal which terminates its body behind.

The tail is different, both in figure and use, in the various species. In land-animals it serves to rid them of flies, and is usually covered with hair, and strengthen'd with bones; in fish it is cartilaginous, and serves them as a helm to steer their course withal in swimming.

In birds it is covered with feathers, and greatly affilizes in all actions and defecants in the air; as also to render their flight ready, by keeping the body upright in that sublime and yielding medium, by its ready turning and anfwering to every vacillation of the body.

TALIF. This part in the fish-kind is the subject of very great diftinctions, among the characters of the several genera. It differs in the several kinds of fish in a very obvius manner, in number, situation, and figure. In regard to the frit difference, the acus lumbriformis, and one of the kinds of the serpens marinus, have no tail at all; in all other fish there is a tail, and it is never more than one on each fish.

In regard to situation, there is this great difference, that in some it is placed perpendicularly, in others horizontally. In almost all the known fish is it placed perpendicularly, except in the dolphin, the phoena, the orca, the manati, and all the whale-kinds; for in all these it is placed horizontally, when the body is laid in its natural posture.
TAI-TONG, a city of China, of the first rank, in Chekiang. It is situated in a mountainous country, and is the only place exposed to the incursions of the Tartars; it is very well fortified, according to the manner of the Chinese, and has a very strong garrison; its territory is surrounded by the great wall, which has forts from place to place; its jurisdiction is very large, and extended over four great cities of the second order, and seven of the third; its mountains abound with all kinds of simple and medicinal herbs, which the botanists gather with great care. Lapis lazuli is great plenty here; and there is a kind of Jasper, which is transparent, and as white as agate; porphyry, marble, and Jasper of all colours are very plentiful; and here is also a great trade for skins; 155 miles W. of Peking. N. lat. 36° 24'. E. long. 112° 42'.

TAI-TUNG, a small island in the sea of Japan. N. lat. 32° 32'. E. long. 130° 42'.

TAI-TSANG, a city of China, of the second rank, in Kiang-nan; 567 miles S.S.W. of Peking. N. lat. 31° 30'. E. long. 120° 24'.

TAIYTAM, a town of Hindostan, in the province of Dindigul; 8 miles N.W. of Ootapalamm. TAJUMA, a river of Spain, which rises in the north part of New Castile, and runs into the Xarana, a little before its union with the Tagus. TAIWAN. See FORMOSA.

TAI-Y, a city of China, of the second rank, in Quang-nan, on the south side of the Pofol; 1125 miles S.S.W. of Peking. N. lat. 23° 24'. E. long. 106° 18'.

TAI-riers, a city of China, of the first rank, in China; 230 miles N.W. S.S.W. of Peking. N. lat. 37° 54'. E. long. 117° 59'.

TAI-SAM, in Ancient Geography, a promontory of the isle of Albion, between the mouth of the Cenius and that of the Diva. (To1.) This is supposed to be Kynard-Head, near Fraserburgh, in Buchan; the Cenius being the river Spay, in the shire of Elgin, and the Diva the river Dee at Aberdeen.

TAK, Et, in Geography, a town of Persia, in the province of S. Abk, 15 miles N. of Zareg.

TAKA, a town of Nubia, capital of a district, called Takhii, on the Belfe; 50 miles S.E. of Ilak.

TAKAGUS, a town of Japan, in the island of Nippon; 60 miles N.W. of Meaco.

TAKAKAKAN, a small island in the Eastern Indian sea, near the east coast of Borneo. N. lat. 3° 8'. E. long. 116° 51'.

TAKALUOTO, a small island on the E. side of the gulf of Bothnia. N. lat. 61° 39'. E. long. 21° 10'.

TAKAMIDJA, a town of Japan, in the island of Nippon; 150 miles S.W. of Meaco.

TAKAUL, a town of Asiatic Turkey, in Caramania; 40 miles N. of Cogni.

TAKAUL, in Asia Minor, is to come-up to a fett and make it fall again closer to the plank, as it works nearer to the timbers.

TAKAN, in Ship-Building, is to diminish its surface by reefing, &c. particularly when the wind increases too much. See TAKING-IN.

TAKENO, in Geography, a town of Japan, in the island of Ximo; 40 miles E.S.E. of 1kva.

TAKERS—Carr-Takers. See Carr-Takers.

TA-KIA-TCHE, in Geography, a town of China, on the W. coast of the island of Formosa. N. lat. 24° 2'. E. long. 110°.

TAKING-IN, in Sea Language, denotes the act of brailing-up and furling the falls at sea, particularly when the wind increases. It is generally used in opposition to setting.

TA-KIRON-HOTUN, in Geography, a town of the kingdom of Corea; 425 miles E. of Peking.

TA-KLACOT, a town of Tibet; 60 miles N.E. of Korint.

TA-KMITSKAIA, a town of Russia, in the government of Tobolok; on the Irtysh; 36 miles S. of Tara.

TA-KPO, a large province of Tibet, which is subdivided into seven takpos. On the N. it has the province of U, on the S. Como, on the E. Cobang, and on the W. Tzhou.

TAKTANG, a river of Russia, which runs into the Lis, N. lat. 62° 4'. E. long. 89° 44'.

TAKY, a town of Bengal; 30 miles E. of Calcutta.

TAL, a name used by some writers on the materia medica to express the dung of peacocks; and by some of the chemical writers for any alkali salt.

TAL, in Botany, a name by which some authors call the plant, whose feed is the fænæum, or oily purging grain of the hops.

TALABON, in Geography, a town on the W. coast of the island of Gilolo. N. lat. 1° 40'. E. long. 127° 20'.

TALABONG, in Ornithology, a name given by the inhabitants of the Philippine islands to a species of heron, common among them; which is much smaller than our heron, and perfectly white all over.

TALABRICA, in Ancient Geography, a town of Spain, in Lusitania, towards the south, upon the Vatna, not far from the sea, S.W. of Langobrige.

TALABROCA, the name of one of the most celebrated towns of Hyrcania. Strabo.

TALACACHA, in Geography, a town of South America, in the province of Tucuman; 15 miles S. of St. Miguel de Tucuman.

TALACOAN, a town of Lower Siam, on an island in the Mecon; 30 miles S. of Juthia.

TALADITES, in Antiquity, gymnical.exer Ces in honour of Jupiter Talave.

TALAFRA, in Geography, a small island in the South Pacific ocean, among those called Hapaae, S.W. of Holaiva.

TALAGIR, a small island among the Philippines; 25 miles W. of Samar.

TALAGOS, a town of Africa, in the country of Sierra Leone. N. lat. 10° 20'. W. long. 13° 40'.

TALAGUADA, a town of South America, in the province of Carthagena; 10 miles N.N.W. of Mompox.

TALAHSECHTE, an Indian town of East Florida, on the river St. Juan, near the bay of Apalache, in the gulf of Mexico; 52 miles N. of St. Mark. This town contains about 30 habitations, constructed of frame-work; and covered with the bark of the cypres-tree. The inhabitants form large handsome canoes of the trunks of cypres-trees, capable of holding 20 or 30 warriors. In these they defend the river on trading or hunting expeditions on the sea-coast, islands, and keys as far as the point of Florida; and sometimes they cross the gulf and fall to the Bahama islands, and even to Cuba, returning with cargoes of spirituous liquors, coffee, sugar, and tobacco.
TALAI-HAI, a town of Chinese Tartary. N. lat. 44° 17'. E. long. 120° 45'.

TALAI-HOTOC, a town of Thibet; 105 miles S.W. of Haratoube.

TALALUM, or Thalatatum, in Ancient Geography, a town of Africa Propria, on the route from Tascapé to the Greater Leptis.

TALAMANCA, in Geography, a town of Spain, in New Caltíle; 14 miles N.W. of Guadalaxara.

TALAMATA, a town of Hindoostan, in Coimbcote; 15 miles N. of Dambcotta.

TALAN, a small island in the sea of Ochotk. N. lat. 59° 30'. E. long. 140° 14'.

TALANGBOANG, a town on the W. coast of Sumatra. S. lat. 4° 21'. E. long. 105° 44'.

TALANT, a town of France, in the department of the Côtc d'Oir; 2 miles N.W. of Dijon.

TALANTA, a town of European Turkey, in the island of Negroponte; 34 miles N.W. of Negroponte.—Allo, a town of European Turkey, in Livadia; 18 miles N.E. of Livadia.

TALA-OSO, a town of Chinese Tartary, in the country of Hami; 28 miles E.S.E. of Hatamatt.

TALAPSCREEN, in Geography, the great N.E. branch of the Alabama or Mobile river, in Florida. It rises in the high lands near the Cherokees, and runs through the high country of the Oakfuille tribes, in a weftly direction, being full of rocks, falls, and shoals, till it reaches the Tackabatches, where it becomes deep and quiet; from whence the course is W. about 30 miles to Little Talafée, where it is united with the Coofa or Coofa Hatcha. The lower part of this river is, in most maps, called Oakfuille.

TALAPUR, a town of Hindoottan, in Calicü; 20 miles N.W. of Tellicberry.

TALARHOKAPALHASSUM, a town of Chincque Tartary, in the country of the Eluths; 715 miles N.W. of Peking. N. lat. 47° 34'. E. long. 102° 34'.

TALAURUS LUDUS, among the Romans, a game somewhat resembling our dice-playing, and performed with a kind of gold or ivory dice, which they shook as we do in a box, before they threw them. There was this difference, however, between their game and ours, that our dice have six sides, because they are cubical; but theirs had but four, and were conically shaped. They made use of them for divination, as well as playing; and they concluded upon a good or evil augury, according to what came up. As they usually threw four of them at a time, the best chance was when four different sides came up. The sides were called by the name of some animal, as the dog, vulture, bafilk, &c.; or of some deity, as Venus, Hercules, &c. Some authors have been of opinion, that they were marked with the forms of animals, or images of gods, and not with numbers or dots, as our dice are.

TALARN, in Geography, a town of Spain, in Catalonia; 22 miles N. of Balagüer.

TALASSEER, or TALSSEE, a country consisting of a tract of land bounded by East Florida on the S., by Alatamaha river, E. by Glynn and Camden counties, and W. by a line extending from the W. part of Ekananoka swamp, in a N.E. direction till it strikes the Alatamaha river, at the mouth of the Okmulgee.—Allo, a town of the Upper Creeks, in the Missipip territory, on the S. side of Talapoosie river; called also Big Talafée.

TALASSEIO, among the Romans, an acclamation used at marriages.

TALATUM, in Ancient Geography, the name of a temple of the sun, erected in Laconia, on the summit of Mount Taygetus.

TALAVAN, in Geography, a town of Spain, in Extremadura; 25 miles S. of Placentia.

TALAVARA la Real, a town of Spain, in Extremadura; 15 miles S.E. of Badajoz.

TALAVARA la Reyna, a town of Spain, in New Caltíle, on the Tagus, situated in a valley, and fortified; famous for its earthen-ware; 35 miles W. of Toledo.

TALAVELA, a town of Spain, in New Caltíle; 6 miles W.S.W. of Toledo.

TALAVERUELA, or Talavera de Badajoz, a town of Spain, in Extremadura, on the Guadiana; 9 miles E. of Badajoz.

TALAUMA, in Botany, a word probably of South American origin, applied in the herbarium of Suriian, now poffessed by Juffien, to the plant on which Plummer originally founded his genus Magnolia. See under that article, p. 2, our reasons for not receiving Taluma, for the present at least, as a distinct genus.

TALBERT'S ISLAND, in Geography, a small island in the Strait of Georgia, on the coast of Georgia, the N. point of which is in N. lat. about 30° 44'; where St. Mary's river discharges itself into the ocean, between this island and Amelia Island on the N. lat. 30° 36'. W. long. 84° 42'.

TALBOT, an island on the coast of East Florida, eight miles long and two wide.—Allo, a county of Maryland, on the e. coast of Cheepakay bay, bounded E. by Cheopank river, which divides it from Carolina county, and S. by the fame river, which separates it from Dorcheifter. The soil of this county is rich and fertile; and it contains 14,250 inhabitants.

TALBOT, in Zoology, a sort of dog, noted for its quick feent, finding out the tracks, lodging, and forms of beafts, and pursuifing them with open mouth and continual cry; with fuch eagerness, that if not taken off by the hufman, he is often fpoiled.

TALC, in Mineralogy, Idem, Haury. The name tafe, in the prefent fytumatic arrangement of Werner, is ploed both as the head of a genus and a family. Brongniart restricts the name to thofe minerals which poflefs the following characters: they are soft and unctuous to the touch, and leave upon the nail, or on the surface of cloth on which they are rubbed, a white mark, which has fometime a nacry hue. The texture of tafe is lamellar, or fibrous; the lamina are flexible but not elate. Tafe has always a fhenic hue, and is oftem fplendid and nacry; it is tranfient and often transparent; it yields easily to the nail. The lamina of which it is compofed, open a little by the action of fire or of the blowpipe; the fragment forfees, and the external forms of the lamina are with difficulty fusible into a white enamel. These characters, which are easily recognized, serve to diftinguish tafe from chlorite and nacrite, which are very fusible; and from fteatite, ferpentine, or the uncrtuous clays, which are compact, have an earthly or fcell fracture, and but little unctuosity. Tafe has another remarkable property; it acquires positive electricity when rubbed with reft. Tafe is fufceptible of cryftallization, and forms hexagonal lamina. The primitive form of the cryftal is a right rhomboidai prifm, in which the angles at the bafe are 120° and 60°. Its Specific gravity varies from 2.58 to 2.87. The prevailing colours are white, apple-green, and yellow.

Tale
Yalc is divided by some mineralogists into three sub-
pecies, viz. common talc, indurated talc, and columnar
talc.

Common talc; talc laminaire, Hauty. Its colours are those before enumerated, but the green sometimes pales into
dark blue. The laminae are very tender and flexible, but not elastic; by this they may be distinguished from the
laminate of mica, which pales a considerable degree of elas-
ticity. In France this talc is called crete de Briangen; it is
found in considerable masses in rocks of serpentine, accom-
panied with actinolite, granular lime-flone, and dolomite, along with indurated talc. The constituent parts are as
follow:

<table>
<thead>
<tr>
<th></th>
<th>Vaquein.</th>
<th>Klaproth.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silex</td>
<td>-</td>
<td>62</td>
</tr>
<tr>
<td>Magnesia</td>
<td>-</td>
<td>61.75</td>
</tr>
<tr>
<td>Alumine</td>
<td>-</td>
<td>27</td>
</tr>
<tr>
<td>Pothash</td>
<td>-</td>
<td>30.50</td>
</tr>
<tr>
<td>Oxyd of iron</td>
<td>-</td>
<td>1.50</td>
</tr>
<tr>
<td>Water</td>
<td>-</td>
<td>2.75</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>2.50</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>2.25</td>
</tr>
</tbody>
</table>

It is found in Aberdenhire and Barnfhillie, in Scotland,
and in various parts of the continent of Europe, where rocks
of serpentine and porphory occur. The talc which is
brought from the mountains of the Tyrol is called in com-
merce Venetian talc.

Talc enters largely into the composition of the cosmetic
toied rouge. This substance is prepared by rubbing to-
gether in a warm mortar, generally of serpentine, certain
proportions of carmine and finely powdered talc, with a
small portion of oil of benzoin. The Romans prepared a
beautiful blue or purple colour, by combining this substance
with the colouring fluid of the buccineum ruticulum and
buccineum lapillus, teltaceous animals abounding on the
coasts of the Mediterranean. The flesh-coloured polishes on
figures made of gypsum is given by rubbing them with talc.
The Persians, according to Tavernier, whiten the walls of
their houses by means of lime-water, and then powder them
with silver-coloured talc. Talc has sometimes been used
medicinally by the Chinese and Europeans.

The chief use of the Russian is as a screen or cover for
paintings in miniature and crayons; to which purpose thin
slices of it are used. The Venetian is sometimes also used
for a fucus; in order to which, by reason of the difficulty of
pulverizing it, &c. they content themselves to rap it
with the skin of a sea-dog, and to pass the raspings through
a sieve.

Pliny, in his Natural History, lib. xxxvi. c. 22. observes,
that the Romans not only used the Russian fort for window-
lights, but they also paved the circus with a kind of it.
See GLASS.

Indurated talc is less flexible and less translucent than the
preceding; it occurs in masses, and has sometimes a radiated
structure; its colours are various shades of green and
greenish-grey. It forms beds of considerable size in moun-
tains of gneiss, mica-flate, and serpentine; it approaches
nearly to pot-flone, and even to flatte, in many of its char-
acters. It occurs in Perthshire and Barnfhillie, in Scotland,
and in France, Sweden, Saxony, Siberia, the Tyrol, and
Switzerland. It is employed for drawing lines by car-
penters, tailors, hat-makers, and glaziers. It is sometimes
made into culinary vessels, like pot-flone, and is employed
in powder for removing stains of grease from silk.

Columnar talc occurs in thin columnar prismatic concave-
tions, and it is opaque. The connection between talc,
serpentine, pot-flone, serpentine, chlorite, and even mica, may
be traced by their apparent graduation into each other, par-
ticularly in some of the rock formations. See Asbestos,
Pot-stone, &c.

The mixture of talc with different kinds and quantities of
glases may be successfully performed with a violent fire, but
not with a smaller degree; thus three parts of talc, with one
part of crysatalline glases, make only a spongy and friable
mafs in a common fire; but in a more violent one, they be-
come a firm and solid mafs of a brown colour. Minium, or
glases of lead, mixed in equal quantities with talc, and set in
a violent fire, runs into a yellowish glases, resembling the
opaque pieces of amber; and two parts of minium to one of
talc, produce a clear and transparent yellow glases, which is
of a hardnes capable of giving fire with feel. The alkaline
earths, mixed with talc, produce a mafs scarcely vitrifiable
by any fire; hence appears the reason why copels made of
lime and talc are so very hard to vitrify. Minium, added
to these mixtures, make them combine into a firm mafs,
but without perfect fusion; but borax added to them, melts
them readily into a true glases. The gypsum earths mixed
with talc, will not unite into a mafs in any degree of fire;
but if borax be added, the talc readily melts. Thus two
parts of talc, two parts of that spår or gypsum matter
called glases Marie, or the common plated spår, with one
part of borax, run into a yellow mafs resembling a topaz.

The argillaceous earths do not vitrify with talc; but they
run into a mafs of great hardnes, which will give fire with
feel, and is very serviceable to make crucibles of, these
vegetables not suffering the glases of lead to run through them.

Talc, joined with the vitrifiable fones, forms no remarkable
body, but the mafs remains friable; but from these mafses,
by the addition of proper matter to render them fluid, great
variety of elegant compounds may be made. Thus if talc be
mixed in equal quantities with powder of flints, on adding
to the whole a fourth part of crysatall-glases, the whole unites
into an opaque but fluid white mafs. Alkalifalt, added in
equal quantity to talc and flint, gives a transparent yellow
glases; and white sand, talc, and a fixed alkali, in equal
quantities, afford a green glases; with other mixtures of this
kind, in different quantities, the resemblances of many
beautiful fones are produced; and what is very remarkable,
some grains of metallic matter are often found on the sur-
face of the mafses.

Cesarpinus, Aldrovand, and some others affirm, that talc
melted with copper, or added to copper, while in fusion,
gave it a white colour; this being taken for granted, authors
have hence agreed that talc contains an arfenchial earth. But
experiment shews this to have been a false assertion, in regard
to talc; and probably it only owes its origin to the cant lan-
guage of some of the alchemists, who have called the flowers
of zinc talc, though these alone must render copper yellow,
not white. Antimony and talc, or calcined with nitre,
rn in a violent fire into a sort of flint, which will give fire,
with feel. With regulus of antimony and the black flux,
it runs into a black mafs; and with bismuth it calcines into
e a grey powder. So little is there in the propofals of the
enamels for the metallization of talc by antimony and bis-

In what part of Mr. Boyle's works the learned author,
from whom the foregoing extract was taken, has found that
talc may be reduced by common fire to a gypsum in an
hour, we know not; but we find that Mr. Boyle fays, that
the calcination of talc is so very difficult, that eminent che-
nists have looked upon calxes of talc as counterfeits.

Works abr. vol. i. p. 160.

Mr. Boyle mentions the extracting of gold from talc, as
having
TAL

having sometimes succeeded. See Works abr. vol. i. p. 160. but vide supra.

TALC, Philosophia, a name given by some of the chemical writers to the flowers of zinc.

This substance, dissolved in vinegar, affords what they have in their unintelligible language called oil of talc, and extolled as a thing of vast power in the fixing of mercury, and many other imaginary operations; and besides this, they call it a sovereign remedy for all diseases.

TALCAGUANO, or TALCOUS, in Geography, a sea-port of Chili, nine miles within the point of the name, and about six from the town of Concepcion. This is the principal port in the bay of Concepcion, and is much the most frequented, as ships that anchor here have not only better ground than in any other part of the bay, but are in some measure sheltered from the north winds. The town, or village, as Peroufe calls it, has been built since the city of Concepcion was destroyed by an earthquake in 1717: it stands on the river Biobin, and is said to contain 10,000 inhabitants. Here are the episcopal cathedral, the seat of the bishop, and all the religious houses. The government of the adjacent district has been wholly military and ecclesiastical. The country round it is very healthy and fertile. Great numbers of cattle are annually killed for their hides and tallow, which are sent to Lima. About 200,000 dollars' worth of gold is annually collected from the fands in the rivers of this biphoric. The Indians of the country have numerous herds of cattle, and plenty of horses, and live more like the Tartars of Asia than the savages of North America. Ships are here supplied with water, wood, and other necessaries. N. lat. 36° 42'. E. long. 73° 6'.

TALCAGUANO Point, a cape on the coast of Chili, 11 leagues N.E. of the island of Santa Maria, and 2 N. of Port St. Vincent.

TALCAN, a town of Asia, in Tokarifan, besieged by Gengis Khan in the year 1221, and taken after a siege of seven months; 100 miles S.E. of Termend. N. lat. 36° 45'. E. long. 67° 6'.

TALCENSTEIN, a mountain of Silegia; 4 miles N.N.E. of Loewenberg.

TALCONAH, a town of Bengal; 36 miles E. of Goragot.

TALCOT, a town of Hindooftan, in Concan; 25 miles N.E. of Goa.

TALCOUS, in Geography, is considered by some geologists as a variety of clay-flate, but it has a nearer resemblance to mica-flate. The colour is generally a greenish-grey, with a shining lustre, like that of the finer kinds of mica-flate. It is softer than mica-flate, but is frequently divided into lamina by thin seams of quartz, and has a twifled or contorted form. The flate on some of the mountains of the higher Alps, as decribed by Sauvage, seems to be of an intermediate kind between mica-flate and talcous flate. Talcous flate occurs on the western side of the island of Anglesea, and in many alpine districts, forming beds in clay-flate. See SLATE.

TALDINGA, in Geography, a town of Bengal; 15 miles W. of Biffulpour.

TAL, in Law. See Count and Declaration.

TAL, or TALE, in Commerce, a weight for gold and silver in China, and certain parts of the East Indies; and also a money of account. In China, each tale is 10 maces = 100 candareens = 1000 cash. A tale of fine silver should be worth 1000 cash, which cash is composed of six parts of copper, and four of lead, having a square hole in the middle, so that they may be strung on a string or wire; but on account of their convenience for common use, their price is sometimes so much raised, that only 750 cash are given for the tale.

Gold is not considered as money, but as merchandise; and it is sold in ingots of a determinate weight, called by the English "shoes" of gold; the largest of which weighs 100 tales, and the gold is reckoned 94 touch (i.e. 94 parts fine in 100), though it is only 92 or 93. Of late, from 100 to 120 tales of silver of 94 touch, have been given for 10 tales of gold of 92 or 93 touch; and sometimes from 110 to 120 tales, or even more, of Spanish dollars, reckoned at 92 touch, have been paid for 10 tales of gold. When gold is exchanged for silver, its price is always valued by the ten-tale weight, and it is sold either above or below touch, as follows: 92g, if the gold be 96 touch, and sold at 5 under touch, subtract 5 from 96, and 91 remains: then 91 tales of silver are paid for 10 of gold: if gold be sold at 10 above touch, the fineness being still 96, add 10 to 96, and 106 tales of silver are paid for 10 tales of gold. Silver ingots are used as money, and are from $^{3}_2$ to 100 tales, their value being determined by their weight. In payment of small sums, they sometimes lay the ingot on the fire, and by striking it with a hammer, detach smaller pieces from it. The English reckon the tale of silver at 6s. 8d. sterlings, so that 1. sterling is = 3 tales. The catty of 16 tales weighs 15 oz. 6 dwts. 4 grs. English troy; so that 10 tales would weigh 572 oz. 6 dwts. 4 grs. English troy. On the whole, the weight of a Chinese tale may be taken at about 580 grains English troy; and therefore 48 tales = 58 ounces troy weight. One hundred Spanish dollars weigh about 722 tales. The heaviest weight for merchandise (peculiar to the coast of Canton) is called pecul, and contains 100 catties or 1600 tales, with the same decimal division as above. Hence a pecul = 132 lbs. 8 oz. 9 dr. avoidopios; and a catty = 21 oz. 33 dr. avoidopios.

At Acheen, in the isle of Sumatra, accounts are kept in tales, pardows, mace, copings, and cashes. A tale = 4 pardows = 16 mace = 64 copings. The coins of the country are mace and cashes. The mace is a small gold coin weighing nine grains, and worth about 144/. sterling. The cashes are small pieces of tin or lead, 2500 of which usually pass for a mace, subject to occasional variation. In Siam, accounts are kept in catties, tales, ticals or tuals, mians, fanangs, and cowries. The catty is 20 tales: the tale = 4 ticals = 16 mians = 32 fanangs: the fanang is = 800 cowries. In Tonquin, accounts are kept in tales of 10 mace or 100 catties. The tale weighs here 1 oz. 4 dwts. 143 grs. English, which is about 10 grs. more than the Chinese tale. Kelly's Cambill.

TALED, in the Jewish Antiquities, a fort of habit that the Jews wore, chiefly when they repeated their prayers in the synagogue. Numbers, xv. 58. Deuteronomy, xxxii. 12.

It served instead of that square garment they wore heretofore, to which Mofes had appointed that they should fallen borders of blue to the four quarters, and fringes or ribbands all along the borders. But at present, that they may not be exposed to the laughter of the people for the too great singularity of their drefs, they content themselves with wearing a square piece of cloth underneath, with four tufts at the four corners, and when they meet in the synagogue to say their prayers, they cover their heads with a square woollen veil, which has four tufts at its four corners. It is this they call tald, or taled. Calmet, Diction. & Leo of Modena, Ceremonies of the Jews, p. i. ch. 11.

G TALEGONG,
TALEGONG, in Geography, a town of Hindooftan, in Dowlahabad; 15 miles S. of Oudighir.—AIlo, a town of Baglan; 12 miles S. of Chandor.

TALEKAN, a town and caffle of Peria, in the province of Khoraffan; 160 miles N.E. of Herat.—AIlo, a town of Peria, in the province of Irak; 30 miles N.E. of Hamadan.

TALENNI, a town of Japan, in the island of Niphon; 160 miles W.N.W. of Mecco.

TALENT, TALEN'TUM, a weight, and a coin, both very famous among the ancients; but very different in different countries.

The value of the talent is very hard to assign in English money, as being used among all the people throughout the East, and its value, and the manner of computation, being different among each; a difficulty abundantly shown by Budæus, in his learned treatise "De Aife." There were various kinds of talents, both with regard to weight and to species; the value of these last still increasing, as the metal of which they consisted was purer, though the talent weights contained the same number of pounds and drachmas. Accordingly, all talent weights are equally fixty mina, and the mina one hundred drachmas; but the drachma of one place exceeding that of another, there hence arose a difference in the talents.

The common Attic talent then (the talent weight we mean) contained fixty Attic mina, or fix thousand Attic drachmas; equal, according to Dr. Arubhnot's reduction, to fifty-fix pounds, eleven ounces, seventeen and one-fixt grains, English troy weight.

There was another Attic talent, by some fain to confift of eighty, by others of one hundred mina. The Egyptian talent was eighty mina; the Antiocian alfo eighty; the Ptolemaic of Cleopatra eighty-fix and two-thirds; that of Alexandria ninety-fix; the Infular talent one hundred and twenty; and that of Antioch three hundred and fixty mina. In the valuation of money, the Grecian talent, according to Dr. Arubhnot, was equal to fixty mina, or reckoning the mina at 3l. 4s. 7d. equal to 193l. 15s.; the Syrian talent in this valuation confifted of fifteen Attic mina; the Ptolemaic of twenty; the Antiocian of fixty; the Euboic of fixty; the Babylonic of seventy; the greater Attic of eighty; the Tyrian of eighty; the Egeian of one hundred; the Rhodian of one hundred; and the Egyptian of eighty mina. (See Arubhnot's Tables of Ancient Coins, &c. p. 33, and Tab. 18, 19, 23, 24.) Stating the Attic drachm of silver at nine-pence of our money, the beltt medium value, the mina of Athens will be worth 3l. 15s.; and the Athenian common talent, 225l.; and the reft may easily be estimated in proportion.

But Mr. Raper makes the Attic talent, which confifted of fixty mina, or fix thousand drachmas, each drachm being equal to fixty-fix and a half troy weight, or 3l. 17s. 4d. sterling, equal to 232l. 32s. See DRACHM.

This ingenious writer also observes, that hilforians and others mention the Egeian and the Euboic talent. The former weighed ten thousand Attic drachmas; but, like other talents, contained only fix thousand of its own; which being fo much heavier than the Attic, the Athenians called it παράθεμα, παραθριον; or the thick drachm. This talent was ufed at Corinth; and in a paflage of Aulus Gellius, lib. i. c. 8, it is valued at ten thousand Attic drachmas; and was probably ufed in moat of the cities of Peloponnesus. If the Attic drachm weighed sixty-fix and a half troy weight, the Egeian fhoild weigh one hundred and ten and five-fixths, which Mr. Raper flates at one hundred and eleven. This Egeian talent he concludes from the mean drachm of fix Macedonian coins, which he found to be one hundred and eleven grains and one-fourth, must have been the fandard of the Macedonian money, till Philip changed it. And it appears likewise to have been the fandard of the Ptolemaic money in Egypt. Pliny indeed (Nat. Hist. lib. xxxiii. c. 3, s.) tells us, on the authority of Varro, that the Egyptian talent weighed eighty Roman pounds; but he fuppofes that this is a falf reading, and that for Egyptium we fhould read Euboicum: for Pliny is speaking of the riches of Afa, where the Euboic talent was used for weighing gold; and it is known, that the weight of that talent was settled at eighty Roman pounds, by the treaty between the Romans and Antiochus. There is a paflage in Polyb. (lib. ix. c. 6. § 86.) which makes the Egyptian talent contain fifteen hundred Attic drachmas. But this, he apprehends, is an injudicious interpolation in the lafl collection of that author.

The Euboic talent, fays this writer, certainly came from Afa; for Herodotus (lib. iii. fect. 89.) tells us, the kings of Peria weighed their gold by that talent: in the fame place he informs us, that the Babylonian talent weighed feventy Euboic minae. Polyb. fays, it weighed feventy Attic minae. Therefore the Euboic talent fhould be equal to the Attic. But Ælian (Var. Hist. lib. i. c. 22.) tells us, that it weighed feventy-two Attic minae; and if fo, the Euboic talent fhould be heavier than the Attic, in the proportion of feventy-two to feventy. By two paflages, cited by Mr. Raper, from Xenophon, Exped. lib. i. it appears probable, that the Babylonian talent weighed above feventy Attic minae, and above feventy Euboic minae; and if Polyb. took his value of the Babylonian talent from Herodotus, as the text now stands, and Ælian his value of the fame from a more correct copy of that author, or from some better authority, the Euboic talent must have been equal to the Attic. Accordingly it contained fix thousand Attic drachmas. Phil. Tranf. vol. hi. part ii. p. 483, &c.

There is another talent much more ancient, and much less than any of those already mentioned, which Dr. Arubhnot calls the Hometical talent of gold, supposed, he fays, to be equal to three Attic aurei. Polyb. fpeaks of fuch a talent. Eukathius upon Homer reckons it worth twenty-four drachmas. That its value was small, whether fixed or uncertain, is confidered from the paflage of Homer, where, describing the prizes at the funeral of Patroclus, two talents of gold are propofed as a more inconsiderable prize than a mare with foal, &c. Hence Mr. Raper, ubi lupta, p. 527, concludes, that it was the fame that the Dorian colonies carried to Sicily and Calabria: for Polyb. tells us, from Arifotle, that the ancient talent of the Greeks in Sicily contained twenty-four nummi, each of which weighing an obolus and a half, the talent mutt have weighed fix Attic drachmas, or three darics; but the daric weighed very little more than one guinea; and if two talents weighed about fix guineas, we may reckone the mare with foal worth twelve; which was no improbable price, then we learn from a paflage in the Clouds of Ariftolophanes, that, in his time, a running horse colt twelve minae, or above forty-fix pounds ferling; therefore this seems to have been the ancient Greek talent, before the art of stamping money had introduced the greater talents from Afa and Egypt.

According to this ancient talent, fays Dr. Arubhnot, some reckone the treasure of king David, particularly that mentioned 1 Chron. xxii.14, which, according to the common reckoning, would amount in gold talents to the value of 547,500,000l. and the silver to above 342,000,000l.; or reckoning according to the decuple proportion of gold to silver,
silver, the two fums would be equal. As David reigned in Judea after the siege of Troy, it is not improbable but Homer and he might use the same numeral talent of gold.

It is suggested by Mr. Pinkerton (Eflay on Medals, in British Antiq. and Numismatics, p. 66.) that all the ancient coins of Asia, Africa, Greece, Magna Graecia, and Sicily, were reducible to three talents or standards. 1. That of Egypt, used in most of the more ancient silver coinages; and as it would seem in even the later of Egypt, Carthage, Greece, &c. 2. The Attic, being the Attic gold standard; afterwards used by Phidias, king of Argos, in estimating gold, and called Euboic, from Euboea, one of the quarters of the city of Argos. It was afterwards used in Athens, and the greater part of the world, as the standard both of gold and silver. 3. The Doric, or Sicilian talent, of 24 nummi, each worth an obolus and a half; whence the talent is estimated at six Attic drachmas, or three drachms. These weights continued to be the standard of money after it began to be distinguished by impression; nay, to the fall of Greece, and prevalence of the Roman empire.

Among the Romans there were two kinds of talents, the little and the great talent; the little was the common talent; and whenever they say simply talentum, they are to be understood as: this little talent was fifty mines or Roman pounds; the mina, or pound, estimated at one hundred drachmas, or denarii; it was also estimated at twenty-four great ferecress, which amounted to six pounds.

The great talent exceeded the last by one-third part. Budæus computes, that the little talent of silver was worth 75l. silver; and the greater gold 24. 8d. silver. The greater of gold was worth i12s. 6d. silver.

Talent, as a fpecie, or money, among the Hebrews, was sometimes used for a gold coin, the famine with the fickle of gold, called also flaver, and weighing only four drachmas. The Hebrews reckoned by these talents as we do by pounds, &c. Thus a million of gold, or million of talents of gold, among them, was a million of shekels, or nummi; the nummus of gold being the same weight with the fellek, viz. four drachmas.

But the Hebrew talent weight of silver, which they called dinar, was equivalent to that of three thousand shekels (Exod. xxxviii. 25. 28.) or one hundred and thirty-pounds, ten ounces, one pennyweight, ten grains, and two-fourths, English Troy weight, according to Arbuthnot's computation.

It should be observed, however, that the talent was not everywhere where the fame. The Hebrew talent weighed more than that of the Greeks, and is said to have amounted to 34l. 10s. 4d. and f. The common Attic talent might be worth about 193l. 12s. which might probably have been used by the Jews in their commerce.

TALES, in Law, a supply or addition of men for those impannoned on a jury of inquest, and not appearing, or at their appearance challenged by either party as not indifferent.

In such cases, the judge, upon motion, grants supply to be made by the sheriff of one or more tales, such as are present in court, equal in reputation to those impannoned. For this purpose, a writ of descent tales, oito tales, and the like, is used to be allowed to the sheriff at common law; and must be fully done at the trial, if the jurors make default; but at the assizes, or nisi prius, by virtue of the statute 35 Hen. VIII. c. 6. and other subsequent statutes, the judge is empowered, at the prayer of either party, to award a tales de circumstantibus, of persons present in court, to be joined to the other jurors to try the cause; who are liable, however, to the same challenges as the principal jurors. This is usually done till the result number of twelve be completed. The tales de circumstantibus is in some measure rendered useless by the statute for regulating juries, 3 Geo. II. c. 25. See Challenge and Jury.

TALGA, in Geography, a town of Hungary; 8 miles N. of Tokay.

TALGARTH, a small town in a hundred of the same name, and county of Brecon, South Wales, is situated on the banks of the river Llyfnâ, at one end of the Black Mountains, which furnish hence to Herefordshire; from its situation it derived its name; Talgarth meaning literally the front of the hill. The town is a borough by prescription, but without privilege, jurisdiction, or municipal officers. The parish church is a substantial edifice, but has no architectural elegance, nor is it enriched by any remarkable monuments, ancient or modern; it has a tower, which forms a conspicuous object from most parts of the surrounding country. The population of the parish, which, besides the borough, contains five hamlets, was in the year 1811 returned to parliament as 1124, the number of houses being 274. No less than eight annual fairs are held here.

In the Forest hamlet of the parish of Talgarth are some vestiges of Dinor-gastle, which, at a remote period, was a fortress of importance, but has long since been demolished. In Leland's time, it was, "ruinus aliquis ad laterem hardground." From its description, it must have been of considerable dimensions. It consisted of three wards "vaullid about," and had three parks and a forest attached to it. From the same writer we learn, that the castle was destroyed by the natives, that it might not be occupied by the sufferers of Owen Glendower.---Beauties of England and Wales, vol. xlvii. South Wales, by T. Rees, F.S.A. Carlile's Topographical Dictionay of Wales.

TALGART, in Geography, a town of Hindoostan, in My-fore; 6 miles S. of Bangalore.

TALGARTON, a town of Peru, in the province of Trak; 50 miles E. of Nehuend.

TALGUL, a town of Hindoostan, in Myfore; 10 miles S.S.W. of Sirpy.

TALHA-KIAMEN, a poet of Chineese Tartary. N. lat. 45° 16'. E. long. 123° 44'.

TALHAM, a town of Austria; 2 miles S.S.W. of Voglbruck.

TALI, a town on the W. coast of the island of Formosa. N. lat. 23° 30'. E. long. 125° 41'.

TA-LI, a city of China, of the first rank, in Yen-nan. This is the principal place where they make curious tables, and other ornaments of fine marble, which is got from a mountain called Tien-fung, and is naturally beautified with different colours, in the form of mountains, flowers, trees, and rivers. Ta-li has under its jurisdiction four cities of the second order, and three of the third; 1205 miles S.W. of Peking. N. lat. 25° 45'. E. long. 100°.

TALIA, in Ancient Geography, a town of the Upper Mosaic, on the route from Vinhainium to Nicoma. Ant. Itin.

TALJARA, in Geography, a town of Bengal; 46 miles S. of Curruckdale.

TALIPAY, a town on the N. coast of the island of Luzon. N. lat. 14° 21'. E. long. 123° 24'.

TALIGALEA, in Botany, an unexplained name, Aublet Guian. 625. 1. 252. Jul. 1599, appears to be the same genus, and even the same species, as Amanoa of Linneus. (See that article.) The fruit of the latter having been examined in a drier state, may solve all the difficulty.

Aublet describes his only species, T. campylaris, as an herb with a perennial root, sometimes creeping. Stens annual, G 2
two or three feet high, simple, leafy, downy. Leaves alternate, flat, elliptical, pointed, from three to six inches long, downy, with tooth-like serratures. The variety with a creeping root has smooth leaves, and we should presume it may be a distinct species. The flowers are yellow, about an inch long, numerous, in a long compound cluster, with ovate purple bracts. Berry black, with two hard seeds.—This plant grows abundantly in the sandy meadows of the island of Cayenne, as well as on the continent of South America, bearing flowers and fruit all summer long.

TALIGONG, in Geography, a town of Hindoostan, in the Carnatic; 7 miles N. of Terriore.

TALIGOV, a town of Russia, in the government of Rig; 24 miles N. of Dorpat.

TALIHOU, a small island, with a lighthouse, on the coast of France. At low-water the land which joins to the continent is dry; 3 miles N. of La Hogue. N. lat. 49° 36'.

G.W., long. 1° 56'.

TALINA, a town of Peru; 50 miles E.S.E. of Lipes.

TAL-IN-HO, a town of Chinese Tartary. N. lat. 41° 10'.

E. long. 120° 56'.

TALINUM, in Botany, a genus of Adamson's, well separated from him by the Linnean Portulaca. (See that article.) Its name no one, not even De Theis, has undertaken to explain; Adamon having given so many barbarous, and even arbitrary ones, that the inquiry might well be deemed alike hopeless and unprofitable. We conjecture, however, that he must have had in his mind the verb *bassar* to be verdant, or flourishing, and consequently *bassarum* or *bassas*, a green bough, for he often wrote words with a T which in Greek begin with a S; and the above idea is suitable enough to the succulent, and debarably verdant, habit of the genus. We hence learn the true accentuation of the word, Talinum. Ehrhart called the genus *Talinum* in honour of Dr. John Philip Rillings, who published at Gottingen, in 1774, a catalogue of the genera of plants, disposed in natural orders. Linnaeus had formerly distinguished it by the name of *Anacampseros*—Adan. Fam. v. 2. 245. Juff. 312. Willd. Sp. Pl. v. 2. 862. Ait. Hort. Kew. v. 3. 148. Parth 365. Lamarck Illustr. t. 102. Gartn. t. 128. (Rillingia; Ehrh. Beitr. v. 3. 132. Orygia; Forst. Ägypt.-Arab. 103. Anacampseros; Linn. Gen. ed. 1. 152. Sims in Curt. Mag. p. 1357.)—Clais and order, Polyandra Monogyna. (Dodecandra Monogynia, Willd.) Nac. Ord. Succulenta, Linn. Portulaces, Juff.

Gen. Ch. Cal. Perianth inferior, of two or five oblong, rather unequal, permanent leaves. Cor. Petals five, spreading, ovate, obfolute, as long or longer than the calyx. Stam. Filaments numerous, capillary, not half so long as the corolla; anthers incumbent, oblong. Fil. Germin superior, roundish; style simple, about as long as the corolla; stigmas three, oblong, reflexed. Peric. Capsule ovate, of one cell, and three, five, or five fixed. Seeds numerous, roundish, affixed to a globular central receptacle.

Eff. Ch. Petals five. Calyx of two or five leaves. Capsule superior, with from three to five fixed, one cell, and many seeds.

Section 1. Stipulas lance. Seeds without wings.

1. T. triangulare. Triangular-flaked Yellow Talinum. Willd. n. 1. Ait. p. 4. (Portulaca triangulare; Jacq. Amer. 147. Obs. faec. i. 35. t. 23. P. racemosa; Linn. Sp. Pl. 640. Helianthemum trilobulare, portulacafolio; Plum. l. c. 142. t. 150. f. 2.)—Leaves flat, channelled, wedge-shaped, margined, with a small point. Cluster simple, with a triangular stalk. Stem spreading.—Native of the sea-shores of the West Indies. Cultivated in Chelsea garden in 1735. Mr. Aiton says it blossoms in the flower, molt part of the summer. The stem is shrubby, two feet high, round, smooth, branched, decumbent in the lower part. Leaves scattered, about one and a half or two inches long, succulent, smooth, thinning, brittle, entire at the edges; occasionally convex, being reflected at the sides, tapering at the base into a short footstalk. Flowers two or more, on a terminal triangular stalk, very elegant, of a brilliant yellow, without scent. Calyx of two leaves. Capsule with three valves.

2. T. crassifolia. Thick-stemmed Red Talinum. (T. crassifolium; Willd. n. 2. T. patens; Andr. Repof. t. 253. Ait. n. 2. Portulaca crassifolia; Jacq. Hort. Vind. v. 3. 29. t. 52. P. crassifolia; Murray in Linn. Syll. Veg. ed. 14. 446.)—Leaves flat, obvate, entire at the point. Corymb compounds, elongated. Stem erect.—Native probably of the West Indies. Jacquin cultivated it at Vienna, and we have seen it flowering in many of the English florists. This differs from the former in its more erect and thicker stem, as well as in the fine pink colour of its flowers. The leaves moreover are not margined. The corymbose, or panicled, many-flowered *flabellum*, at first terminal, are sometimes overtopped by the aggregate leafy branches, and thus become lateral, or axillary. Murray, from mere inaccuracy in transferring, altered Jacquin's original name, for one which has here no appropriate meaning.—Willdenow seems to have copied him, without seeing the work of Jacquin; which from this, and some other instances, we suspect he had not in his possession. We do not think it necessary to perpetuate such an error, any more than that of Andrews, who took this plant for Willdenow's *T. patens*, see n. 4.

3. T. fruticosum. Shrubby White Talinum. Willd. n. 7. (Portulaca fruticosum; Linn. Syll. Veg. ed. 13. 371. P. paniculata; Linn. Sp. Pl. 640. P. americana latifolia erecta, floribus albis; Comm. Hort. v. 1. 7. t. 4.)—Leaves flat, obvate, somewhat margined. Corymbs compound, elongated. Stem erect. Calyx of five leaves.—Native of the West Indies, or of South America. This species, a stranger to our gardens, appears to differ essentially from the two foregoing in having five leaves to the cymes, instead of two; to lay nothing of the white petals. In habit, leaves, and inflorescence, it comes very near the last. The capsule is said to consist of three valves in both.

4. T. patens. Panicled Red Talinum. Willd. n. 4. Haworth Succ. Pl. 123. (T. paniculatum; Gartn. t. 2. 219. Portulaca patens; Linn. Mant. 242. Jacq. Hort. Vind. v. 2. 71. t. 151. P. paniculata; Jacq. Amer. 148.)—Leaves flat, obvate, obtuse. Panicle repeatedly compound, forked, many-flowered.—Native of rocks on the sea-coast of Martinico and Hispaniola. Jacquin. We have seen it in the English florists, as Mr. Haworth likewise appears to have done, when he remarks that the *patens* of Andrews is a widely different plant. (See our 2d species.) That before us has an upright shrubby stem, one or half or two feet high, branched; somewhat quadrangular below. Leaves scented, or imperfectly opposite, obvate, lanceolate or oval, more or less obtuse, very smooth and juicy; the lower ones three inches long, the rest shorter; all tapering at the base into a short footstalk. Panicles solitary at the top of the stem and branches, erect, from six to ten inches long, with numerous, mostly opposite, repeatedly subdivided, and partly forked, slender, smooth, spreading *flabellum*, accompanied here and there by small lanceolate *bracteas* at their base. Flowers numerous, small, inconspicuous. Calyx of two orifices, cono-ovate, red, widely spreading leaves. Petals five, obvate, red, thrice the size of the calyx, likewise widely spreading. Capsule globose, smaller than a pepperscorn, its three valves, which Jacquin describes as double, or of two
two layers, suspended from the top of three intermediate fibres. See Gérard's figure and description, where the synonym of Commelin, which belongs to the foregoing, is very erroneously cited for the present species. This must have arisen from Linnaeus's having once again called the former *Portulaca paniculata*, and Gérard's having copied the above synonym without examination.

5. *T. reflexum*. Panicled Yellow Talinum. Cavan. L.c. v. 1. t. 1. Haworth Succ. Pl. 124. Curt. Mag. t 1543. Ait. Epit. 375. (T. patens; Wild. n. 4.)—Leaves somewhat convex, elliptical-lanceolate, acute. Panicle twice compound, many-flowered.—Native of South America.—An annual or biennial, scarcely shrubby, plant in our flowers. Mr. Haworth observes, it is more tender, and much taller, than the last, of which Willdenow thought it a mere variety. We are not sure that the differences indicated in our specific characters are sufficient or permanent, not having had an opportunity of comparing the two plants. The flowers of *T. reflexum* being yellow, seem an important distinction in this genus. Both species are said to be abundantly propagated by seed.


7. *T. decumbens*. Decumbent Glaucous Talinum. Willd. n. 6. (Portulaca decumbens; Vahl Symb. v. 1. 33. Ozryga decumbens; Forlk. eg. Arab. 103.)—Leaves flat, obovate, pointed. Chillers axillary. Stem decumbent. *Calyx* of five leaves.—Native of Arabia Felix, in sandy places near Mafa, but not common. *Forkall.* Stem shrubby, with angular branches, clothed, like the rest of the plant, with a glaucous mealylock. *Leaves* entire, flaccid, thickish, somewhat wavy. *Clasps* from the bosoms of the uppermost leaves, with an awl-shaped scale, or bracteas, opposite to each partial flank. *Capsule* of five valves. *Vahl.*—*Forkall* describes numerous lanceolate petals, about twenty, of a reddish violet, and five cells, as well as valves, to the *capsule*.


9. *T. Anacampferos*. Round-leaved Talinum. Willd. n. 3. Ait. n. 3. "Decand. Pl. Gräsîes, t. 3." (Rülinga Anacampferos; Ehrl. Beitr. v. 3. 133. Haworth Succ. Pl. 124. Portulaca Anacampferos; Linn. Sp. Pl. 639. P. africana fempervires, flore rubico; Comm. Hort. v. 2. 177. t. 89. Telephialtrum folio globo; Dill. Elth. 375. t. 281.)—Leaves ovate, acute, smooth; convex and tumid beneath. *Stipulas* filamentous, many times shorter than the leaves. Petals obovate.—Native of the Cape of Good Hope. Cultivated by Sherard in 1732. A greenhouse plant, flowering in July. A humble shrubby species, wholly extremely thick and succulent leaves, about an inch long, give it the habit of an *Aloe*. They are fleshy, of a pale glaucous green, not shining; their upper side nearly flat, with a longitudinal furrow; the under very convex. *Sipulas* short, in many capillary segments. *Flowers* crimson, the size of our second or third species, in long-stalked terminal simple *claspers*, which are sometimes two together. *Calyx* of two leaves. *Petals* somewhat pointed. The *seeds* are said to be winged. Ehrlert calls them arilata, tunicated.—The specific name, borrowed from Pliny, derived from *sustentare*, to support, and *ob-, love*, was at first adopted by Linnaeus as a generic appellation for the present plant, when he considered it as a distinct genus from *Portulaca*, in his earlier publications. But this name, and the foolish superfluity to which it alludes, of the very touch of the herb restoring alienated love, rather belongs to the *Sedum Anacampferos* of Linnaeus, and its near relation *S. Teophila*. See *Sed*.

10. *T. arachnoides*. Cobweb Talinum. Ait. n. 4. (Anacampferos arachnoides; Sims in Curt. Mag. t. 1368. Rülinga arachnoides; Haworth Succ. Pl. 125.)—Leaves elliptical, acute; slightly convex, and covered with cobweb-like down above; tumid beneath. *Stipulas* filamentous, shorter than the leaves. Petals elliptical.—Found by Mr. Maffon at the Cape of Good Hope, and sent to Kew about the year 1790. It is treated like the last, and agrees with that species in general habit, though smaller in size. The *petals* are les glaucous; the lower ones covered with a kind of web. *Sipulas* longer and more robust. *Flowers* white, with a faint blush. *Seeds* observed by Mr. Haworth to be winged.

The leaves are represented in the Botanical Magazine with a tinge of purplish-brown. Perhaps Mr. Haworth's *Rülinga rubens*, n. 5, may be only a higher-coloured variety.

11. *T. filamentofum*. Thready Talinum. Ait. n. 5. (Anacampferos filamentofus; Sims in Curt. Mag. t. 1367. Rülinga filamentofus; Haworth Succ. Pl. 125.)—Leaves ovate, bluntish, tumid and covered with cobweb-like down on both sides. *Stipulas* filamentous, longer than the leaves. Petals lanceolate.—Found by Mr. Maffon, at the Cape of Good Hope, and sent to Kew a few years after the last, from which it differs in having smaller, blunter *leaves*, and much longer, more conspicuous, *filipalas*, whose segments are linear and flattened, like shavings of horn. The petals are rose-coloured, and elliptical-lanceolate, very fugacious, as in the two foregoing species. We have never seen Mr. Haworth's *Rülinga lanceolata*, n. 5, but it seems, by his definition, nearly akin to this.

The winged seeds can hardly entitle the species of this section to form a separate genus, there being too little difference in habit. If they did, the name of *Rülinga* must certainly be preferred to *Anacampferos*, the latter, notwithstanding its right of priority, having been arbitrarily and erroneously applied to these Cape plants, with which the ancients were of course unacquainted. See our remark under the 9th species.

**TALIO, Lex Talionis, or Pana Talionis, a retaliation, or punishment, by which an evil is returned perfectly like that committed against us by another; which is what we usually express by the words, *eye for eye, tooth for tooth*.

The *pana talionis* was enjoined by the law of Moses, among the Jews; it was esteemed a natural piece of justice, and yet the Romans let it abide, inasmuch as such a parity or equality of punishment could not always be observed. For this reason the prator allowed such as had suffered an injury to make an effeque of it in money, that justice might be done him that way; only referring to himself the power of moderating the same. And this was what was contrantly practised, and thus the *pana talionis* became quite diffused with them.

**TALISIA, in Botany, a barbarous name of Aublet's, which
which he appears to have fabricated out of the Caribbean appellation of the plant in queñan, Toulichi. We should be inexcusable in giving more than a temporary function to such a name, till the genus is either better known than at present, or set altogether aside.—Aubl. Guian. 349. Juss. 247. Lamarck Ilutr. t. 310.—Clafs and order, Ochthotia Monit.

Gen. Ch. Cal. Perianth inferior, of one leaf, in five deep, acute segments. Cor. Petals five, ovate, inserted into the orbicular receptacle of the flower beneath the germen. Nectary of five short, hairy, upright scales, one inserted into the base of each petal, covering the stamens. Stam. Filaments eight, short, inserted into the orbicular receptacle; anthers oblong, of two cells. Pirk. Germin superior, minute, rounded, of four cells; style one, very short; stigma simple, obtuse. Per. unknown.


1. T. guianenfsis. Toulichi of Guiana. Aubl. Guian. 349. t. 136.—Native of banks of rivers in Guiana, flowering in October. A shrub, whose trunk is three or four feet high, and as many inches in diameter, with a greyish bark, and whitish wood; the branches long, compound, variety spreading. Leaves alternate, pinnate, very large, each compounding of about thirty alternate, stalked, elliptic-lanceolate, pointed, entire, smooth, venous leaflets, besides an odd one, from five to six inches long, and above one broad. Clus. axillary and terminal, doubly compound, many-flowered, all over of a rich rose-colour, with a small calyx brosia under each subdivision. Flowers small, in little tufts, nearly sessile. Nothing is known of the fruit, except that the germen has four cells, nor is any thing recorded concerning the qualities or uses of this plant.

TALISKERAN, in Geography, a town of Períia, in the province of Adirbeitzan; 100 miles N.E. of Are.

TALISMANS, magical figures engraved or cut under certain superfluous observances of the charactarisms and configurations of the heavens; to which some astrologers, hermetical philosophers, and other adepts, attribute marvellous virtues, particularly that of calling down celestial influences.

The word is pure Arabic; though Many, after Salma-
fus, thinks it may come from the Greek tules, operation, or constitution. Borel says it is Pèrian, and signifies literally an engraven constellation. Others derive it from talamnica, hieris, which are mysterious characters, or cyphers, used by forcerers, thus called from talamnica, a phantom, or illusion.

The author of a book, entitled, Talismans juflicfas, says, a talisman is the seal, figure, charactar, or image of a heavenly sign, constellation, or planet, engraved on a symphatetic stone, or on a metal corresponding to the star, &c. in order to receive its influences.

The talismans of the Samothracians, so famous of old, were pieces of iron, formed into certain images, and set in rings, &c. They were held prefervatives against all kinds of evils. There were other talismans taken from vegetables, and others from minerals.

In the general, we may distinguish three kinds of talismans. Afroanticual, which are known by the signs or con-
ellations of the heavens engraved on them, with other figures, and some unintelligible characters. Magical, which bear very extraordinary figures, with superfluous words and names of angels unheard of. And mixt, which consist of signs, and barbarous words; but have no superfluous ones, or names of angels.

Some rabhins maintain, that the brazen serpent, raised by Mofes in the wilderness, for the destruction of the serpents that annoyed the Israelites, was properly a talisman.

All the miraculous things sought by Apollonius Tyana-
xus are attributed to the virtue and influence of talismans; and that wizard is even said by some to have been the in-
ventor of talismans.

Some authors take several Runic medals, at least medals whose inscriptions are in Runic characters, for talismans; it being notorious, that the northern nations, in their heathen state, were much devoted to them. M. Keder, however, has shewn, that the medals here spoken of are quite other things than talismans.

TALISSE, in Geography, a small island in the East Indian sea, near the N. coast of the island of Celebes. N. lat. 10° 40'. E. long. 124° 50'.

TALK, in Mineralogy. See TALC.

TALKAN, in Geography, a town of Perìia, in the province of Irak; 30 miles E. of Sultania.

TALKAVE, a town of Períia, in Khoral; 50 miles E. of Tabalkili.—Aho, a town of Períia, in Segefa; 21 miles S.W. of Kin.

TALKIAN, a town of Grand Bucharâia; 80 miles S.S.W. of Balk.

TALKING. See SPEAKING.

TALLAGH, in Geography, a post-town of the county of Dublin, Ireland, where is the ancient and noble residence of the archbishops of Dublin; 5 miles S.W. by W. from Dublin.

TALLANO, a town of Corsica, and capital of a distric, in the department of the Lamonre, situated in a bay of the Mediterranean, called the "Gulf of Tallano"; 30 miles S.S.W. of Corte. N. lat. 41° 33'. E. long. 9° 11'.

TALLAPOUR, a town of Hindooftan, in Oude; 22 miles N.E. of Lucknow.

TALLARAPESCET, a town of Períia, in the province of Mazanderan; 21 miles S. of Fehrabad.

TALLARD, a town of France, in the department of the Higher Alps, on the Durance; 9 miles S. of Gap.

TALLARO, in Commerce, a silver coin of Tuscany, Venice, and Ragula. At Florence the tallaro is = 6 lire or 9 piaisi, the lire being worth about 8 d. The new tallari of Ragula, called libreto, coined between 1791 and 1794, are of the weight of 1 oz. 10 darats, containing 9 parts of pure silver to 6 of alloy; and the value of the tallaro was reckoned at 80 grosseti. Since 1796 there have been coined ducats of 40 grosseti, containing 9 parts of pure silver and 11 of alloy. The ducat of 1796 is worth 15 livres, nearly which is the value of the Turkifh piastre of the late coinage.

By Mr. Bingley's assay, the mint price of silver in Eng-
land being 5s. 2d. per ounce standard, the tallaro of Venice (1/2, &c. in proportion) is worse than English standard (W.) 1 oz. 3 dwt., its weight 18 dwt. 10 grs., its content in pure silver 357.1 grs., and value in sterling 42. 25. The tallaro and its divisions are marked with the head of a woman, legend, Repubblica Veneta; reverse, a winged lion, and a book; legend, the reigning doge's name, thus Paulo Raiario duc.

The assay of the tallaro of Ragula, or Raguan of 1759, is W. 4 oz. 2 dwts., its weight 18 dwts. 7 grs., its content in pure silver 356.4 grs., and its sterling value 42. 11 ¼. That of 1774, W. 4 oz. 4 dwts., weight 18 dwts. 81 grs., content in pure silver 352.3 grs., and value 42. 11 ¼. That of 1794, W. 3 oz. 19 dwts., weight 18 dwts. 17 grs., content 357.6 grs., and sterling value 38. 14 ¼. The ducat of
TALLIS, TALLAGUM, a certain rate, according to which barons and knights were annually taxed by the king towards the expenses of the state, and inferior tenants by their lords, on certain occasions.

That raised to the king was on his demesnes, escheats, and wardships, and upon the cities and burgs of the realm. When it was paid out of knights' fees, it was called cutage (which see); when by cities and burgs, tallage; when upon lands not of a military tenure, bidige; which see.

This latter tallage of the customary tenants was sometimes fixed and certain, and sometimes at the pleasure of the lord; and was also sometimes compounded for.

Tallages were anciently called cuttings; which name is still retained in Ireland, though in a different signification.

Tallagge, says Sir Ed. Coke, is a general name including all taxes; and is derived from the French tallis, tas, founded on the tally of petty tradesmen; as the country people appointed to collect it, not being able to write, scored down what they received on tallies. See Land-Tax and Sunstary.

TALLIKI, in Geography, a town of Africa, in the kingdom of Bondou, inhabited by Foulahs of the Mahometan religion, in the road of the caravans; 70 miles W.S.W. of Patteconda. N. lat. 13° 50'. W. long. 11° 45'.

TALLIPOUR, a town of Hindoostan, in Bahar; 10 miles S.E. of Hajiipour.

TALLIS, Thomas, in Biography, the master of Bird, and one of the greatest musicians, not only of this country, but of all Europe, during the 16th century, in which many noble contrapuntists flourished.

He was born early in the reign of Henry VIII., but though it has frequently been asserted that he was organist of the chapel royal during the reigns of that monarch, Edward VI., Queen Mary, and Queen Elizabeth, yet it would be difficult to prove that, in the three first of these reigns, laymen were ever appointed to any such office. In the reign of Henry, and his daughter Mary, when the Roman Catholic religion prevailed, the organ, in convents, was usually played by monks; and in cathedrals and collegiate churches and chapels, by the canons, and others of the priesthood. The first lay organists of the chapel royal upon record were Dr. Tye, Blithman, the master of Dr. Bull, Tallis, and Bird; all during the reign of Queen Elizabeth.

Though the melody or plain-song of the cathedral service was first adjusted to English words by Marbeck, yet Tallis enriched it with harmony. Indeed the melody used by Tallis is not exactly similar to that of Marbeck, it is only of the same kind; consisting of fragments of the ancient ecclesiastical canto fermo. But the harmony in which he has clothed it is admirable; and the modulation being so antique, chiefly in common chords or fundamental harmony to each note of the diatonic scale, often where the moderns have sixths, sevenths, and their inveritons, produces a solemn and very different effect from any music that has been composed during the last century. As all melody, in which the femitones are avoided, mult resemble that of Scotland; to all harmony, in which neither the tritone nor false fifth occurs, and where the second, third, and fifth of the key, are only accompanied with common chords, must remind us of that which prevailed in the sixteenth century; and though to ancient appear new to our ears, from its long disuse.

There are two compositions by Tallis for the organ, preferred in Queen Elizabeth's Virginal Book, one of which is dated 1561, and the other 1564; both built upon a dull and unmeaning ground, or fragment of plain-chant (feliciamque), and both allied dry, elaborate, and difficult, to hands formed by modern music. The little melody and rhythm in the composition of these times required all the harmony that could be crowded into them. Notes are multiplied without end, and difficulties created without effect. It is not by the instrumental music, which had been but little cultivated, that we must judge of the genius of old masters; but by vocal, in parts; where the harmony and contrivance compensate for want of accent, taste, and invention. The Latin motets and hymns, or "Cantiones facres," which he published jointly with those of his disciple Bird, are perhaps the best of his compositions that have been preferred. These appeared in 1575, under the following title: "Cantiones quae ab Argumento facres vocantur quinque et sex Partium, Autoribus Thomas Tallafio et Gillemio Birdo Angliis, Serenissima Regina Majestati à privato facello Generosiss. Organis." At the time of this publication, a very arbitrary and monopolizing patent was granted by Queen Elizabeth to these composers, for twenty-one years, not only for the publication of their own productions, vocal and instrumental, but those of all other musicians, whether English, French, or Italian, as well as for the sole ruling and vending of music-paper.

Most of these excellent compositions, of which the words were originally Latin, were afterwards adjusted to English words by Dr. Aldrich, and others, for the use of our cathedrals. The canons, invocations, augmentations, diminutions, and other learned and fashionable contrivances of the times, which were of very difficult accomplishment, are carried to a wonderful degree of ingenuity in these productions.

Dr. Thomas Tudway, of Cambridge, made a very valuable collection of English church music, in fouro, from the Reformation to the Restoration, in six volumes, quarto. For Lord Harley, afterwards earl of Oxford, which is now among the Harleian manuscripts, in the British Museum, No. 7337. In the first volume of this collection we have the whole service of Tallis in D minor, in four parts, containing the Te Deum, Benedictus, Kyrie Eleison, Gloria, Magnificat, Nunc Dimittis, and Litany, as printed in 1760, by Dr. Boyce; with several anthems in four and five parts; as, "Wipe away my sins!" "With all our hearts and mouths!" "O Lord, give thy holy spirit!" "I call and cry!" and his anthem, "Discomfit them, O Lord!" erroneously said by Dr. Tudway to have been set for the victory over the Spanish Armada, 1588.

In Christ-Church, Oxford, are manuscript scores of his Preces, Litany, and Anthems, among others by Bird, Parratt, Bull, Gibbons, and Child. Five of his motets and full anthems, in five parts, to Latin and English words, are likewise here preserved among the works of other English masters, in Dr. Aldrich's collection. But the most curious and extraordinary of all his labours was his "Song of Forty Parts," which is still subsisting, and now before us. This wonderful effort of harmonical abilities is not divided into choirs of four parts; sopranos, altos, tenor, and bass, in each, like the compositions a modi criis of Benavoli, and others; but consists of eight treble, placed under each other;
other; eight mezzi sopranis, or mean parts; eight counter-tenors; eight tenors; and eight basses; with one line allotted to the organ. All these several parts, as may be imagined, are not in simple counterpoint, or filled up in mere harmony, without meaning or design, but have each a share in the short subjects of fugue and imitation, which are introduced upon every change of words. The first subject is begun in G, by the first mezzo sopranis, or medinis, and answered in D, the fifth above, by the first soprano; the second medius in like manner beginning in G, is answered in the octave below by the first tenor, and that by the first counter-tenor in D, the fifth above; then the first base has the subject in D, the eighth below the counter-tenor; and thus all the forty real parts are severally introduced in the course of thirty-nine bars, when the whole vocal phalanx is employed at once, during six bars more. After which a new subject is led off by the lowest base, and pursued by other parts, severally, for about twenty-four bars, when there is a general chorus of all the parts; and thus this stupendous, though perhaps Gothic, specimen of human labour and intellect, is carried on in alternate light, purfuit, attack, and choral union to the end; when the Polyphonic phenomenon is terminated by twelve bars of universal chorus, in quadrangintemial harmony. The entire composition consists of one hundred and thirty-eight bars, in ala breve time.

This venerable musician died in November, 1585, and was buried in the old parish church of Greenwich, in Kent. The following epitaph, which Dr. Boyce has printed in the first volume of his Collection of Cathedral Music, Strype, in his Continuation of Stow's Survey, printed 1720, says he found engraved in Gothic letters, on a brass plate in the chancel.

"Entered here doth lie a worthy wyght,  
Who for long tym ye musick bore the bell:  
His name to shew was Thomas Tallis hyght,  
In honest vertuous lyff he did excell.  
He serv'd long tym in chappell with grete prayse  
Fover sovereyynes reignes, (a thing not often feene)  
I mean king Henry and prince Edward's days,  
Queene Marie, and Elizabeth our quene,  
He maryed was, though children he had none,  
And ly'd in love full three and thirty yeres  
With loyal fpowle, whose name yeclpt was Jone,  
Who here entomb'd, him company now bears.  
As he dyd lyve, so also dyd he dy,  
In myld and quyet fort, O happy man!  
To God ful oft for mercy did he cry,  
Wherefore he lyves, let Deth do what he can."

The stone to which this plate was affixed had been renewed by Dr. Aldrich; but the old church having been pulled down, about the year 1720, in order to be rebuilt, no memorial remains of Tallis, or any other illufrious per- son, who had been interred there anterior to that period.

TALLOW, a sort of animal fat, melted down and clarified. There are scarcely any animals but a sort of tallow may be prepared from; but those which yield the most, and of which the most use is made, are the horse, bullock, heep, hog, goat, deer, bear, and viper. Some of which tallow, or fats, are used in medicine, and called asunzia.

Most of the rest are used in the making of soap, and the dressing of leather; but chiefly in making of candles. For this purpose, large quantities are annually imported from Russia in casks. (See CANDLE.) Tallow-chandlers also melt tallow, which is done by chopping the fat, as it is taken from oxen and heeps, and then boiling it for some time in a large copper; and when the tallow is extracted by this process, the remainder is subjected to the operation of a strong iron press; and the cake that is left, after the tallow is expressed from it, is called a "grave." With this dogs are fed, and most of the ducks that are reared in the vale of Aylburlany, and which supply the London markets. It is also sometimes given to oxen and pigs, but certainly without meleriorating the flavour of the meat.

It has been observed, that candles should be made without any admixture of oil or grave; and when laid up, should be preserved from the action of the atmosphere. For this purpose, some persons keep their candles closely covered up in bran. If tallow is weak, a part from becomes converted to an acid by exposure to the air; and this renders the whole, when melted together, unfit for candles. Tallows, also, that contain a large portion of fatty acid, require much more barley than good tallow, in the manufacture of soap, and yet produce a less quantity. Foreign tallow, which frequently contain a large portion of acid, rendering them inferior to the English, may be purified at an insignifi- cant expense by chemical means; and by the proper application of chemical agents, other brown tallow may be rendered beautifully white, and fit for the bell purposes. The mode, says a chemical writer of reputation, which naturally prelents itself as the bell for separating the fatty acid from tallow, is that of melting it in water containing some alkalai: but old tallow may in general be sufficiently purified from their ranciditv by melting them upon lime-water, and giving a considerable agitation to the whole mixture; for when the water is again suffered to subside, it will be found to be offensive in smell, and to have subtracted most of the impurities of the tallow. If the tallow, however, should not be sufficiently purified, a repetition of this process would completely effect it. Parke's Chemical Essays, vol. i. p. 67, &c.

Tallow-Tree, in China, is a tree growing in great plenty in that country, which produces a substance like our tallow, and serving for the same purpose. See CROTON."
neck. The Leicestershire graziers, it is said, contending as much for the latter as the former, is considered as a test of merit in Norfolk, and various other counties. But when it is considered, that it requires a certain portion of food to create a given quantity of fat, the question is, it is thought, which is the belt part to collect it upon,—within or without? As long as the fat of the latter will sell at more than one-third of the other, it would seem, it is said, that there cannot be a doubt which of the two is preferable; and that, upon the principle of food eaten to produce the tallow or fat, that which tallow there is the belt breed. The tallow, with the major part of the fifth quarter, is all the butcher's profit, it is said, who would no doubt encourage that breed which tallow be, and yields most offal.

It is noticed, however, that the South Down sheep are not great tallowers, compared with some other fotts; but that what they lose in tallow, they make up in a disposition to fatten. The tallow of a wether, in common management, will, is said, generally average from an eighth to a tenth part of its dead weight. In a fat wether of Mr. Ellman's, one-seventh part of the dead weight was, it is said, inside fat (caul and loosef fat); and that in another which was since killed, one-sixth was inside fat. In others, too, that have been slaughtered, the variation has been found from a seventh to a tenth. The quantity of inside fat depends, it is said, much upon the age and time of fattening. It gathers itself much more in old sheep than in young ones.

The bad ill-formed breeds of sheep, for the most part, tallow in the largest and most favourable manner; and the sire is mostly the one in neat-cattle flock, as those which have the best forms and dispositions for fattening have commonly the least property of tallowing well, or afford the least proof, as it is often called.

In regard to the superiority of fat meat, it may be just noticed that, in some great thoroughfares for travelling, the inn-keepers agree with the butchers to give them a penny the pound above the common price for mutton, provided it be very fat. It is likewise the same with beef. This is said to be the case at Peterfield, and to strongly shew that very fat mutton, or meat of any kind, will go much farther than that which is not equally so. It, however, makes against tallowing in animals of these kinds. See Live-Stock and Sheep.

TALLWATER, in Geography, a river of Ireland, in the county of Armagh, which runs with the Cullen into Blackwater, near Charlemont.

TALLY, Taille, or Tallie, a piece of wood on which retail traders ufe to fcore or mark, by notches or incisions, the several quantities of goods they deliver out on credit, to save the trouble of writing down fo many little articles in books.

Each score consists of two pieces of wood, or rather of a fingle piece cleft length-wise, the parts of which falling in with one another, things delivered are scored on both at the fame time; the feller keeping one, and the buyer the other.

Tallies are taken as evidences in courts of justice, as much as books. The ancient way of keeping all accounts was by tallies; the debtor keeping one part, and the creditor the other. Hence the taller of the exchequer, now called the teller.

There are three kinds of tallies mentioned in our statutes, and long used in the exchequer: viz.

Tallies of Loans, one part of which is kept in the exchequer, and the other part given to particular persons, in lieu of an obligation for the monies they have lent to the government on acts of parliament. This falt part is called the flock, and the former the counter-flock, or the counter-tail.

The tallies are numbered, and bear the person's name, and the sum lent; thus we say, the tallies, No. have been paid, or discharged; tallies are riven, fallen, 4.5. &c.

Tallies, or Tallyes of Debt, are a kind of acquaintances for debts paid to the king.

E. 75. The university of Cambridge pays yearly 10l. for such things as are by charter granted them in fee-farm. He that pays this receives a tally, or tally, for his discharge, with which, or a note of it, he repairs to the clerk of the pipe, and there for the tally receives a full discharge on parchement.

Tallys of Rents, or allowances. These are made to sheriffs, for such matters as (to their charge) they have performed in their office, or by such money as is by courfe call on them in their accounts, but which they cannot levy.

In the exchequer there is a tally-court, where attend the two deputy chamberlains of the exchequer, and the tally-cutter.

Tally-Counter. See Counter.

Tallies, Cutter of the, See Cutter.

Tally, Petty, See Petty.

Tallies, Writer of. See Writer.

Tally the Sheets, at fee, a word of command, when the sheets of a main-fall or fore-fall are to be hauled aft. See Sheets.

Tally for Flowers and Plants, in Gardening, that sort of mark or contrivance, either by pieces of lead or slips of wood, employed for distinguishing them.

The practice of marking flowers, trees, and plants, with tallies of some kind or other, is always highly useful and necessary in regulating their culture, as well as for many other purposes.

TALLYOR, in Geography, a town of Hindoostan, in Myfore; 8 miles N.W. of Dindigul.

TALMAS, a town of France, in the department of the Somme; 9 miles S. of Doullens.

TALMAI, a town of France, in the department of the Côte d'Or, at the union of the Vigenne and the Saône; 18 miles N.E. of Dijon.

TALMOND, a sea-port town of France, in the department of the Lower Charente, on the right side of the Gironde, with a harbour; 18 miles S.W. of Saintes.

TALMONT, a town of France, in the department of the Vendée; 6 miles E.S.E. of Sables d'Olonne.

TALMUD, or Thalmud, from תלמוד, doctrinæ, from מונד, he taught; a Jewish book, which contains a collection of all that relates to the explication of their law. The Talmud is the body of the Hebrew law; a compilation of expositions of the duties imposed on the people, either in scripture, or by tradition, or by authority of their doctors, or by custom, or even by superstition: to speak more plainly still, it is the course of cafes of confection, or of m oral theology, in which the duties are explained, and the doubts cleared, not by reasoning, but generally by authority, by the custom of the nation, and by the decisions of the most approved of the ancient doctors.

The Talmud consists of two general parts, the one called the Mifchna, the other the Gemara; which first part is also frequently called absoluently the "Talmud," the general name of the whole work.

The Jews divide their law into written, which is that contained in the books of Moses; and unwritten, which is that conveyed by tradition. This latter is, in effect, no other than a gloss or interpretation of the former, given by the ancient rabbins.
The Talmud then contains the traditions of the Jews, their polity, doctrine, and ceremonies, which they observe as religiously as the law of God itself: they would never put them in writing till they were compelled to it by the destruction of Jerusalem, and till they saw themselves dispersed throughout the world.

They had two famous schools: the one at Babylon, and the other at Jerusalem: in the former they made two several collections of these traditions; the first at Jerusalem, the other at Babylon; but both called Talmud, both exceedingly reverenced, especially the Babylonian, though full of extravagancies. This was compiled by the Jews of Mecopotamia, about 500 years after Christ, according to Buxtorf; but Father Morinus offers several reasons to prove that it was not finished till the year 700. The last edition of this Talmud, at Amsterdam, is in twelve folios.

The Talmud of Jerusalem is the least esteemed. It was compiled by the Jews of that city, and particularly by Rabbi Jochanan, rector of the academy at Tiberias, about 300 years after Christ, according to Buxtorf; but Father Morinus, in his "Exercitationes Bibliques," lib. ii. exer. 6. judges, from several barbarous terms found in it, of Vandalic or Gothic extraction, that it did not appear till the fifth century. This is published in one large folio.

The Babylonian Talmud consists of two parts: the one the text, the other the glosses or comment: the comment, called the Gemara, contains the decision of the Jewish doctors, and their explications of the text.—This we find stuffed with dreams and chimeras; together with much ignorance, and many impertinent questions and disputations: the style is also very coarse. On the contrary, the text called the Mishna, is written in a tolerably pure style, and the reasonings generally much more solid.

The Jews pretend that this was composed by Rabbi Judah, surnamed the Saint; and that God revealed to him the doctrine, and the chief mysteries of it. But this is only to be understood of the Mishna, not of the Gemara, the compilation of which was not begun till the fifth century, after the destruction of the second temple.

Rabbi Judah is said to have composed the Mishna under the empire of Antoninus, in the second century; but they do not all agree about this antiquity, some carrying it back much farther.

It is the Talmud of Babylon that is usually read, and most frequently consulted, among the Jews; so that when they say simply "the Talmud," they always mean this; never quoting the other without the addition of Jerusalem.

Maimonides has made an abridgment of the Talmud, which Scaliger prefers to the Talmud itself; as being purged of many of the fables of which the other is full. It is a fyllem of the laws and customs of the Jews, both of their civil and their canon law, and the bent of their traditions.

About the year 1236, a Jew of Rochelle, well versed in the Hebrew, becoming Christian, made a journey to pope Gregory IX., and discovered to him a number of errors in the Talmud: the pope sent, in thirty-nine articles, to the archbishops of France, with a letter, appointing them to seize the books of the Jews, and to burn all such as should contain those errors: in consequence of which order, about twenty cart-loads of Hebrew books were burnt. He wrote to the same effect to the kings of England, France, Aragon, Castile, &c.

His successor, Innocent IV., giving commission to his legate, Enudes de Chateauroux, to examine the Talmud, and other Jewish books, more carefully, and to tolerate such errors as were not contrary to the Christian religion; the legate wrote to the pope, that to tolerate them was to ap-prove them; and the 14th of May, 1248, he also condemned them juridically to the flames; and Paul IV. ordered 12,000 volumes of the Talmud to be burned; and Clement VIII. ordered all the talmudic books that could be found to be destroyed; a zeal worthy of the Papal see! See MISHNA, GEMARA, CARAKITES, and RABBINISTS.

TALO-CHAN, in Geography, a small island near the coast of China. N. lat. 29° 57'. E. long. 122° 4'.

TALOIRE, a town of France, in the department of Mont Blanc; 8 miles S.S.E. of Annecy.

TALON, in Ornithology, the claw of a bird.

TALON, in Architecture, a kind of moulding, consisting of a cymatium, crowned with a square fillet; frequently found to terminate ornaments of joiners' work, as those of doors, &c.

The word is French, and literally signifies heel.

The talon, more properly so called, is a moulding concave at the bottom, and convex at top; having an effect just opposite to the docine.

When the concave part is at top, it is called an inverted talon.

The talon is usually called by our English workmen agge, or O.G. and by authors an upright or inverted cymatium.

TALOO, in Geography, a harbour on the N. coast of Emau; which see.

TALOVKA, a river of Russia, which unites with the Analik, and runs with it into the Irgis, 32 miles E. of Volik, in the government of Saratov.

TALPA, the Mole, in Zoology, a genus of the Mammalia Feræ, the characters of which are, that the front teeth in the upper jaw are fix and unequal, those in the lower jaw are eight; the canine teeth are one on each side, the upper ones being the largest; and that the grinders are seven in the upper jaw, and six in the lower. Gmelin enumerates four species, besides several varieties.

Species.

EUROPEA; Common Mole. Has a short tail, and pentadactylylons or five-toed feet. The body is thick and cylindrical; the snout slender, but very strong and tenacious; the head not distinguished from the body by any appearance of neck; the legs to extremely short, as scarcely to project perceptibly from the body; the fore-feet situated obliquely outwards, excessively strong and broad, and furnished with very large and stout claws, so as to give the animal the power of working under the surface with the utmost ease and readiness; the hind-feet are small in proportion to the fore-feet, and are calculated for throwing back with ease the mould from behind the creature, during its subterraneous progress: the tail is short and small; the skin is much thicker and tougher in proportion than in other quadrupeds, and the fur with which it is covered equally surpasses that of other animals in fine nesses and softnesses. The muscular strength of the mole is very great, and it is enabled to force itself into the ground with an extraordinary degree of celerity. The general length of the mole is about five inches and three quarters, exclusive of the tail, which measures one inch. This animal is supposed to possess the power of hearing in an exquisite degree; and if at any time it emerges from a subterraneous retreat, instantly disappears on the approach of any danger. When first taken, either by digging it out or otherwise, it utters a thrill terrific, and prepares for defence by exerting the strength of its claws and teeth. According to the count de Buffon, so lively and reciprocal an attachment subsists between the male and female, that they seem to dread or dreads all other society.

It has been doubted whether the mole has eyes adapted to vision,
TAL

vifion, or merely for the purpose of apprising it of the approach of light, so as to warn it of the danger of exposure. Galen is of the former opinion. Sir Thomas Brown refers this to the classes of vulgar errors; but Derham, by dissection, and the aid of a microscope, confirmed the opinion of Galen. This animal is said to feed not only on worms and insects, &c. but on the roots of vegetables: however, it is more carnivorous than frugivorous. In particular circumstances it is very fierce and voracious. Without damp mould for its residence, it is kept alive with difficulty in a flate of confinement. Like other animals of a black colour, the mole is sometimes found perfectly white, or cream-coloured, and sometimes spotted. Gmelin reckons four varieties, viz. the variegated or spotted mole of Edwards, the white, the yellow, and the eburnian. Of its surprising power in swimming, we have a curious instance recorded in the 3d volume of the Transactions of the Linnean Society; which is that of a mole that was seen swimming towards a small island in the middle of the loch of Clunie, in Scotland, at the distance of 180 yards from the land. Linneus and Gmelin affirm that the mole passes the winter in a state of torpidity; but this is contradicted by Buffon, and he alleges facts to prove the contrary. The mole is said to be unknown in Ireland. In Siberia it attains a larger size than in Europe, and its fur is so soft and beautiful, that it would make the most elegant articles of dress, were it not for the difficulty of curing and dressing the skin. See Mole.

ASIANICA. Has no tail, and tridactylous fore-feet. This is the Siberian mole of Pennant. It is somewhat smaller than the common mole, its length being four inches; and is a native of the Cape of Good Hope.

LONGICAUDATA. With a tail of middling length, and pentadactylous feet, the hinder ones scaly. This is the long-tailed mole of Pennant: its length from nose to tail is four inches and six-tenths; and it is a native of North America.

RUBRA; Red Mole of Pennant. Has a short tail, tridactylous fore-feet, and tridactylous hind-feet. This is said to be a native of America.

Dr. Shaw mentions some other species, as the T. purpureoalbo, or black mole, with a glos of purple, pentadactylous feet, and white tail, still described by Seba, and by him said to be a native of Virginia:—the T. radiata, or black mole, with white feet, and nose radiated with papilla; an inhabitant of North America:—the Sorex cristatus of Linnaeus; a variety, as Dr. Shaw says, of the T. longicaudata:—and the T. forster, or brown mole, with white feet and tail, the fore-feet very broad; a native of North America, and supposed to be the same with the Sorex aquaticus of Linnaeus.
Linnaeus, or caffia lignea tree. It is a large and lofty tree, the flowers and fruit of which resemble the cinnamon-tree. Its leaves, when full grown, are ten inches or more in length; and fix or eight in breadth. The flowers stand in clusters, in the manner of umbels on the tops of the branches, and are of a greenish-white colour. The fruit is of the bignests of our currant.

The ancients recommended Indian leaf as flatmichic, fudorific, and cephalic. At present, it is utterly disregarded, being only kept in the shops as an ingredient in mithridate and thyrnaca; and is, in its greatest perfection, far inferior to the mace which our college directs as a succedaneum to it. See CASSIA Lignea.

TAMALIPAN, in Geography, a chain of mountains in Spanish North America, called by Alcedo, in his description of New Leon, the Grand Sierra, and a branch of which is called the Eastern Tamalipa by Alzate. This last branch extends from the deserts of Jaumape to the eastern coast of the province of Santander, where it is marked in the Spanish chart of the gulf of Mexico by the names of various peaks; while the mountain of Oceantes, visible at sea at the distance of 160 miles inland, must nearly equal Oriaza in height, and appears to belong to the same branch of the grand ridge of Tamalipa.

TAMALMA, a town of Africa, in the country of Kavar; 120 miles N. of Kaseem.

TAMAMES, a town of Spain, in the province of Leon; 15 miles E. of Cividad Rodrigo.

TAMAN, an island at the mouth of the Kaban, and a principality belonging to it, and also a town on the same island, called Phanagoria, (which see.) This principality was ancienncly occupied by the Chazaras; but it was wrested from them in the year 965 by the Russian combined with the Byzantine Greeks, who made themselves masters of the countries bordering on the sea of Azof in 1015, and completely overturned the Chazar state, creating a distinct principality on the isle of Taman, to which both the Chazaras and the Tichians were for a long time tributary. See TUTARAKAN.

Towards the end of the 11th century, while Russia was torn by intestine broils, the principality of Taman was left to that empire. At length, in 1221, the Mongoles made their first attack. The Romanes were expelled or subdued, but the Ziches fought for their liberty, and could not be made to submit till the year 1277, when they were overpowered by Margu-Timur-Khan and the famous Nogay. Nevertheless, they retained some degree of independence in their woody and mountainous regions. The Ottomans indeed, in 1484, conquered the cities and forts of Taman, Temruyk, and Atcheluk; but they gained no sovereignty over the Ticherkaffians or Circassians. At the peace of 1774, the sultan of the Ottomans relinquished his possessions in these parts; but, contrary to treaty, held Taman and Temruyk in a state of siege, till the Crimean khan, by the aid of the Russians, drove the Ottoman garrison out of them. By the treaty of the year 1783, Russia obtained, together with the Crimea and the Eastern Nogay, the northern part of the Kaban as far as the promontory of Caucasus.

The Zichians or Tichekians, called by the Russians Yafi, are the principal inhabitants of the isle of Taman. They formerly paid a small tribute to the Crimean khan, but in all other respects are governed by their own beys. The isle Atcheluk or Atcheluyef is likewise inhabited by Zichians. These two tribes, which, properly speaking, are only one collateral branch of the Ticherkaffians, have longed to the Russian empire, as inhabitants of the Kaban, since the year 1783.

TAMAN, the strait or channel that forms a communication between the Black sea and the sea of Azof.

TAMANAH, a sea-port town of Hindooftan, on the coast of Malabar, in the country of Concan; 25 miles S. of Grenchi. N. lat. 16° 32'. E. long. 75° 15'.

TAMANDUA, in Zoology, a creature called in English the ant-bear; and by the Brazilians "tamanduagaun," and the tamauros of Buffon; different species of the same genus. See MYRMECOPHAGA.

TAMAR, in Geography, a considerable river, which originates in the county of Cornwall, England, and separates that county, except for the space of a few miles, from Devonshire. It rises in a moor in the parish of Morwington, about three miles from the North sea; passing near Whiteline, about ten miles from its source, it reaches Tameron, which takes its name from this river; here it receives the waters of the Werrington, and about a mile and a half further its current is increased by the Attery, which runs under the walls of the town of Launceston: at Poultontbridge it is a wide and rapid stream; a mile below Graitonbridge it is joined by the Innec, which, rising in Alternon, passes through the parishes of Lewick and Lezant. In the parish of Stoke-Clifton, the Tamar has a high, strong, stone bridge, called by Leland "Haverbrigg," or the High bridge, now commonly Horace-bridge. The last or lowest bridge on this river is in the parish of Callstock, and was begun, according to Leland, by Sir Piers Edgcume. Five miles farther the Tamar receives the Tavy from the east, and having made a creek into the parishes of Botesfleming and Landubuloh on the west, becomes a spacious harbour; and after passing near the ancient borough of Saltash, is joined by the Lynher creek and river. Increasing in importance as it winds along, it next forms, between Dock and Saltash, the noble basin called the "Hamoaze," or Plymouth Harbour, where a large portion of the British navy rides in complete security. Having made two large creeks, one called St. John's, the other Milbrook, on the west, and Stonehouse creek on the east, the Tamar, after a course of about 40 miles nearly south, falls into the sea, having mount Edgcumbe for its western, and the lands of Stonehouse and St. Nicholas island for its eastern boundary, and produces the noble road for shipping named Plymouth Sound. The Tamar is one of the most considerable rivers in the west of England; its banks are richly diversified with rocks, woods, and meadows; and the scenery in various parts of its course is extremely interesting and beautiful. The views about the Cater-marther rocks, Tavistock-Newbridge, the Morwell rocks, Cotele and Pentilly, are peculiar, and can scarcely be equalled by any other river in the western part of the kingdom. (See PLYMOUTH HARBOUR.) Lysons's Magna Britannia, vol. iii. Cornwall. Beauties of England and Wales, vol. ii. Cornwall. By J. Britton and E. W. Brayley.

TAMAR, a town of Arabia, in the province of Hedgejas; 40 miles N.N.W. of Karac.

TAMAR BAY, a harbour in the straits of Magellan, E. of Cape Tamar.

TAMARA, in Ancient Geography, a river of Spain, which rose in the mountains W. of Lucus Augusto, and discharged itself into the sea to the W. of a small gulf, on the banks of which were Grandisirum and Acre Softianum. Mela calls this river Tanaris. The TamariSci inhabited its banks.

TAMARA, a town of the isle of Albion, assigned by Ptolemy
lemy to the Damnonii or Dumnouni. Mr. Horfley thinks it was Saltaf; but Mr. Camden and Mr. Baxter suppose it, more probably, to be Tamerton, which still retains its ancient name.

TAMARA, in Geography, a town of Morocco, on the coast of the Atlantic; 30 miles W. of Tarantud. — Alto, a sea-port town on the N.W. coast of the island of Socotra, and residence of the king.

TAMARA Isles, or Islands of Idola, a cluster of islands near the coast of Sierra Leone. N. lat. 8° 40'.

TAMARA, in Botany, the Hindoo name of a very celebrated plant. (See our article CYAMUS, written by the late Rev. Mr. Wood.) The above name should seem to originate from the Hebrew 77, Tamar, a Palm-tree, whence dates are called Tamara by the Spaniards; and it may allude to the form of the seeds of the CYAMUS, resembling dates; or to their similar use as an oriental article of food.

Tamar is also the Arabic name of the same fruit. See TAMARINDUS.

TAMARAC, TAMARAC, or TAMARICA, in Geography, a district of Brazil, in the jurisdiction of Fernambuco. It has its name from an island on the coast, near the mouth of the river TAMARAC, which constitutes the principal part of its district, though the territory thereof extends inland between 50 and 50 leagues, having Paratyba on the north, Fernambuco on the south, the ocean on the east, and uniled Indians on the west. It was reckoned one of the most ancient and flourishing captainships in Brazil; but Paratyba and Fernambuco have since exceeded it. The island is parted from the main land by a very narrow channel. It is fertile and pleasant enough; producing large quantities of Braili wood, cotton, cocoa-nuts, sugar, melons, citrons, &c.; besides a good deal of timber for fuel and other purposes. It is about nine miles in length, and three in breadth, and about 22 in circuit. It has a commodious haven on the south side, with some good springs and rivulets of fresh water. The entrance into the port is by a channel of between 15 and 16 feet water, commanded by a castle, built on an eminence, and formerly taken by the Dutch; who also built Fort Orange; at the mouth of the channel, which was inaccessible, by reason of the marshes surrounding it; so that the vessels that sailed down from the island were exposed to it, and they had in some measure chopped all the avenues from the Portuguese. This island, and the territory on the continent belonging to it, pay 5000 ducats to the governor of the captainship, and in it are reckoned to be about 22 sugar-mills. The French had formerly a canton or settlement on this coast, still called from them "Porto dos Francos;" but the Portuguese obliged them to evacuate it. The capital, called "Notra Seignora de Conceicao," or "Da TAMARAC," islands at the entrance into the river of the latter name; and near it is a small castle with a redoubt, commanding the avenues; and about four miles N. of the mouth of the river is the famous point denominated "Punta Pedro."

TAMARA, a river of Bresil, which runs into the Atlantic, S. lat. 7° 52'.

TAMARIL, a town of Spain, in Catalonia, situated about a mile from the sea-coast; 2 miles N.E. of Terragona.

TAMARINDUS, in Botany, the Tamarind-tree, is so called from TAMARAC, which is Hebrew for a Palm-tree, (and likewise the Arabic appellation of its fruit, the Date,) combined with the Latin word Indus, Indian. The form of the pod, and its use as an article of food, may well have given rise to the name. (See TAMARA.)—Linn. Gen. 23. Schreb. 450. Willd. Sp. Pl. v. 3. 577. Mart. Mill.


Gen. Ch. Cul. Periathan inferior, of one leaf; tube turbinate, compressed, tapering at the base, oblique at the mouth, permanent; limb in four deep, ovate, acute, flat-tish, reflexed, coloured, deciduous segments; the upper and lower ones rather the broadest. Cor. Petals three, ovate, acute, connate, crenate, wavy, reflexed, the length of the calyx, inserted into the mouth of the tube; the two lateral ones rather the largest. Stam. Filaments three, inserted into the mouth of the calyx in the vacuity opposite to the uppermost petal, awl-shaped, as long as the corolla, connected in their lower half, curved upwards; anthers ovate, large, incumbent. There are besides seven rudiments of stamens; five of them fetaeous threads, capitate, very short, alternate with the above, connected in their lower part, two lower than the rest; and two minute bristles, proceeding from the calyx beneath the filaments, and lying upon them. Fijl. Germen oblong, compressed, incurved, seated on a stalk, which springs from the bottom of the calyx, and is attached longitudinally to the back of its tube within, the projecting part downy along its upper edge; style awl-shaped, ascending, downy at its lower edge, rather longer than the stamens; stigma tubiform, obtuse. Peric. Legume oblong, compressed, obtuse, with a point, swelling at the seeds, of one cell, not curving; its coat double; the outer dry and brittle; inner membranous; a quantity of soft pulp being lodged between the two. Seeds few, orbicular, somewhat angular, flattened, hard, polished, with a central circumferibed disk at each side.

Eff. Ch. Calyx in four deep segments. Petals three. Barren filaments seven. Style one. Legume pulpy within. 1. T. indica. Tamarind-tree. Linn. Sp. Pl. 48. Willd. n. 1. Ait. n. 1. Jacq. Amer. 10. t. 10. and t. 179. f. 98. Woodyv. Med. Bot. t. 166. (Tamarindus; Rumph. Amboin. v. 2. 90. t. 23. Ger. Em. 1607. Balam-pulhi; Rheede Hort. Malab. v. 1. 39. t. 23.)—This tree, a native of Egypt, Arabia, and the East Indies, is generally preferred, rather than cultivated, in both Indies for the sake, both of its shade, and its acid, cooling, and highly grateful, as well as testy, fruit; the pulp of which, mixed with boiled sugar, is frequently imported into Europe, and highly esteemed. The trunk is lofty, and of considerable thickness, crowned with wide-extended branches, bearing unbranching twigs of alternate, abruptly pinnate, smooth, bright-green leaves, each composed of many pair of elliptic-oblong, feathery, entire leaflets, rather glossy beneath. Flowers in smany clusters, terminating the short lateral branches. Petals yellow, elegantly veined with red. Fruit pendulous, like large hearts. Gardiner observes that the Weit Indian Tamarind pod is shorter than what Rheede and Rumphius represent, and has fewer seeds. Hence he distinguishes two species, which appear from history as well as observation to be mere varieties, the plant being more at home in the easter than in the western side of the globe, though almost perfectly naturalized in the latter. It is often seen in our borders, but seldom in blossom. —As Dr. Woodville has given an original coloured plate of this interesting plant, drawn by Mr. Sowerby from a specimen that flowered in Kew garden, and the only one of authority extant; we conceive it work, in this instance, if not in every other, might have been cited with advantage, by our friend Mr. Aiton, in the Hortus Kewensis. Tamarindus, in Gardening, contains a plant of the exotic tree kind, of which the species is the tamarind-tree (T. indica);
which grows to a very large size in the countries where it is a native; the tree being very large, and covered with a brown bark, dividing into many branches at the top, which spread wide every way; the flowers come out from the side of the branches, five, six, or more together, in loose bunches; the pods being thick and compressed, those from the West Indies, from two to five inches in length, containing two, three, or four seeds; but those from the East Indies are almost twice as long, and contain five, six, and even seven seeds. The tree is a native of both the Indies, and of some other places.

Method of Culture.—This is a plant which is increased from seeds, which should be sown in the spring on a hot-bed, and when the plants are come up, each planted in a separate small pot, filled with light rich earth, plunging them into a hot-bed of tanners' bark to bring them forward, watering and shading them until they have taken root; and as the earth in the pots becomes dry, they must be watered from time to time, and have air given in proportion to the warmth of the seafon, and the bed in which they are placed. When the pots in which they are planted are filled with their roots, the plants should be shifted into pots of a larger size, which must be filled up with rich light earth, and again plunged into the hot-bed, giving them air as before, according to the warmth of the seafon; but in very hot weather, the glasses should be shaded with mats in the beat of the day, otherwise the fun will be too violent for them through the glasses; nor will the plants thrive if they are exposed to the open air, even in the warmest seafon; so that they must be constantly kept in the bark-flake, both summer and winter, treating them in the same manner as the coffee-tree. These plants have a good effect in the flower collections.

It is the fruit-pods of this tree which form and constitute the favor called tamarinds, which is sold in the shops; and of such a pulpy acid quality, as to be of great use in abating and quenching thirst, and in cooling and allaying excessive heat. It is brought hither from both the East and West Indies; but though the pods of the trees of the former situation are much finer and larger, the favor from the latter is generally considered better, and of course mostly preferred.

There is nothing peculiar in the making of this sort of favor, except the same methods being followed as are common in the preserving of other substances of similar kinds.

Tamarindus, in Materia Medica. The East India tamarinds are longer than those of the West; the latter containing six or seven seeds each, the latter rarely above three or four; nevertheless they seem to be the produce of the same plant; the Oriental is drier and darker-coloured than the Occidental, and has more pulp; the former is sometimes preferred without addition, but the latter has always an admixture of favor.

In the West Indies, the pods are gathered in June, July, and August, when fully ripe; and the fruit, freed from the fleshy fragments, is placed in layers in a cask, and boiling syrup poured over it till the cask is filled. When cool, the cask is sealed for sale. When tamarinds are good, they are not in any degree mushy; the seeds are hard, flat, and clean; the fibers rough and entire, and a clean knife thrust into them does not receive any coating of copper. They should be preserved in clothe-covered jars.

We owe the knowledge of the use of tamarinds, in medicine, to the Arabian. The ancient Greeks knew nothing of them; and Sapiens, Mefue, and Avicenna, are the first authors who prescribe them.

The fruit of the tamarind, which is what we use, is only the pith of the flower swelled into a pod; this is greenish at first, but grows brownish, or reddish as it ripens; its common size is four inches in length, and one in breadth; and it is undulated on the back, and deeply notched in three or four places at the front, which is terminated by a large rib, that runs from the pedicle on which it grows, to the end of the pod, and there frequently terminates in a fort of hook.

This fruit is, properly speaking, composed of two pods, the one enclosed within the other; the outer pod is flabby, and of the twelfth of an inch in thickness when fresh, and the inner one is as thin as a fine piece of parchment between these two there is an intermediate space of about a quarter of an inch all the way; and this space is filled up with a very soft and pulpy substance, of a tart but very agreeable taste, which is what we use in medicine. This is blackish, and of a viscous texture, and is traversed by three large vessels, or rather bundles of vessels, one of which runs all along the back of the pod, and the two others are placed on the opposite side, and often there are several ramifications of vessels, which run off different ways from these. These vessels carry the viscous juice, which afterwards hardens into the viscous matter of the pulp; but this is not all their office, for they also convey nourishment to the seeds in the inner pod.

We use the tamarinds only in medicine; but the Africans, and the people of many of the Oriental nations, where they are common, make them into a fort of confection withugar, which they eat as a delicacy, and which cools them in the violent heats of their climates; and at the same time keeps their bowels in a proper state of laxity. The four tenth of this fruit proves, that acid particles abound greatly in it; and a chemical analysis of it gives further proof of this.

According to the analysis of Vauquelin, the pulp contains, independently of the sugar with which it is mixed, supertartarate of potasfs, gum, jelly, citric acid, tartraric acid, malic acid, and a fequeulent matter. The acid taste chiefly depends on the citric acid, as its quantity exceeds that of the others, and on the prepared pulp, containing 5/12 of citric acid, but only 3/12 of tartaric acid, 5/12 of supertartarate of potasfs, and 3/12 of malic acid. Annales de Chimie, vol. v. p. 92.

The effential part of tamarinds, as Beaumé observes, may be obtained more expediously, by clarifying the decoction of the tamarinds with whites of eggs, than by filtering and evaporating it to a proper consistence, and setting it to cool; the falt shotts into crysals of a brown colour, and very acid tafe, but in dissolving and crystallizing them again, or barely washing them with water, they lose almost all their acicity; the acid principle of the tamarind seeming not to be truly crystallizable.

The pulp of tamarinds is an agreeable laxative acid, of common use in inflammatory and putrid disorders, for abating thirst and icat, correcting putrefaction, and loofening the belly. The dofe, as a laxative, is-two or three drachmas; an ounce or two prove moderately cathartick. It is an useful addition with this intention to the purgative sweetes, caffia and manna, in increasing their action, and rendering them less liable to produce flatulences; the resinos cathartick are said to be somewhat weakened by it. Lewis.

This pulp is an ingredient in confectio cafe and confechio fernce, and in the infilum tamarindum cum fenna.

Tamariscus, in Botany. See TAMARIX.

Tamarisk Plant, in Agriculture, is a plant of the large shrubby kind, which has lately, it is said, been employed in some southern situations which are much exposed to the sea air, and other effects of it, with great utility. It is capable of being readily raised and propagated by means of cuttings of the last year's growth, as they take root withou
out any difficulty, and are, of course, admirably adapted as plants for forming hedges. It is the French fort that is made up of in this way. See Quicksset-Hedge.

TAMARITE, in Geography, a town of Spain, in Aragon; 16 miles E.S.E. of Baltaalto.


Gen. Ch. Cal. Perianth inferior, in five deep, obtuse, erect, permanent segments, half the length of the corolla. Cor. Petals five, ovate, obtuse, concave, spreading. Stam. Filaments five at leaf, capillary; anthers roundish. Pfilt. German pointed; Ryle none; ligmas three, oblong, feathery, revolute. Peric. Capsule oblong, pointed, triangular, longer than the calyx, of one cell and three valves. Seeds numerous, minute, each with a flaked feathery crown.

Obf. T. germanica has ten flaments, five of which, alternate with the others, are external and shorter; all are connected at the base. Linn.


1. T. gallica. French Tamarisk. Linn. Sp. Pl. 386. Willd. n. 1. Fl. Brit. n. 1. Engl. Bot. t. 1318. Sm. Fl. Græc. Sahib. t. 291. unpublished. Mill. lct. t. 262. f. 1. (Tamaricis carbonenensis; Ger. Em. 1378. Lob. f. c. v. 218. Myrica; Camer. Epit. 74. t. 1.)—Stamens five. Clusters lateral. Branches smooth. Leaves lanceolate, imbricated, spurred at the base. —Native of rocks and banks, or of swampy ground, especially towards the sea, in the south of Europe, and north of Africa, very abundantly. It is plentiful about the coasts of Cornwall, Hampshire, and Suffolk, undoubtedly wild. This shrub appears to have been common in the English gardens, as it still is, in Gerarde's time; and yet Camden, in his life of queen Elizabeth, attributes to archbishop Grindall, who died in 1538, its being first brought into England, and made known as “exceeding good to ease the hard deftermer of the fpice.” (See our 7th species.) Mr. Hudson has not admitted any of this genus into his Flora. Dr. Sibthorpe found this plant common in rather moist situations in Greece, nor can there be any doubt that it is the Magnes of Dioscorides. The Turks call it H Gilin. On the eastern coast of Italy we have observed it to be the favourite food of sheep, probably on account of a falthy flavour, perceptible to our taste. This is an elegant, drooping, fender-branched shrub, with smooth and fining twigs, of a mahogany red. Leaves minute, rather feshy, lanceolate, acute, smooth, deciduous, with a fetherful spur, as in fome species of Sedum; imbricated on the youngift fhootes; scattered on the older twigs. The flowers appear in July, in copious, long, cylindrical chiflers, rather than spikes, at the fides of the later year's fhootes. Bracteas awl-shaped, solitary, at the base of each smooth and naked fpartial flalk. Calyx bell-shaped, acute, smooth. Corolla and fiaments white or red-coloured.

Wildenow's variety B we shall next describe as a distinct species; his T. africana of Poiré, gathered by this traveller in Barbary, is faid to have peculiarly short, thick and dentif spikes, but we are not furnished with any further information on the subject.

2. T. tamoinds. Downy-branched Tamarik. (T. gallica B; Willd. n. 2. T. pentandra varia); Pall. Rofs. v. 1. p. 2. 72. t. 79. BCD.)—Stamens five. Clusters lateral. Leaves imbricated, axil-shaped, elongated, hoary and downy as well as the branches. Found by Pallis in falt sandy deserts about the Caffian sea. He speaks of this plant as a fingular very elegant variety of the preceding, about fix feet high, with all its branches downy and hoary; the younger ones thicker than in the common T. gallica, which he choofes to call pentandra, and the leaves longer, hoary, denfely imbricated; all the parts being thicker and more crowded. In the chiflers and flowers he observed no difference. Wildenow's fluggiflion, of this being probably a diftinct species, is apparently well-founded.

3. T. articulata. Jointed-branched Tamarik. Vahl Symb. v. 2. 48. t. 32. Willd. n. 2. (T. orientalis; Forlk. Egypt.-Arab. 206. Thuya aphylla; Linn. Sp. Pl. 1422, excluding the fynonym of Shaw.)—Stamens five. Spikes lateral. Branches jointed. Leaves fheeting, abrupt, with a fhort spreading point. —Gathered by Forlkall in Arabia. The original fpecimen, erroneously confidered by Linneaus, for want of ftructification, as a Thuya, appears to have been brought from Egypt, or the Levant, by Haffelquint. The plant of Shaw is Thuya articulata, which will hereafter be defcribed under its proper genus. We find no certain evidence of the Tamarisk before us being as a native, as Vahl fays, of the Earl Indies, and we imagine he confounded it with our next species. The true plant of Haffelquint and Vahl has common fender branches, appeaming when young as if jointed, each joint being crowned with a minute dotted scale-like leaf, whofe annular fabe encircles the branch, and whofe short, creft, keeled, acute point projects on one fide. The leaves are permanent, enlarged, and membraneous on the older branches. The flowers are defcribed by Vahl as forming lateral spikes about the ends of the branches, each flower being fellef, accompanied by a braited reftembling the leaves, but with a widely-spreading point. Segments of the calyx roundish and obtufe. Petals the fize of T. gallica, linear, or rather elliptical. Stamens five. Capsule with four angles, pyramidal.

4. T. epacroides. Earl Indian Tamarik. —Stamens five. Clusters lateral and terminal. Leaves ovate, acute imbricated, clasping the ftem; gibbous at the base. Bracteas awl-shaped, longer than the flowers. —Found by Keeng growing plentifully on the banks of a river in the Earl Indies, which he calls flamen Collarum maximum. We have the fame from Rotter and Roxburgh. This is unquestionably diftinct from the preceding, and hitherto undetermined. The young branches have no jointed appearance, nor do the leaves surround them with an annular permanent fabe. The latter are fucculent, of a broad triangular shape, tapering into an infexit point: the ferial ones, or braites, much narrower, coherred, ftrongly keeled. Flowers very small, on short partial fachts. Segments of the calyx broad and obtufe, fringed. Petals elliptical. Capsule flaccidly above a line in length, prismatic, accompanied by the permanent flaments, which are generally rather longer. Whether the T. chinenis of Lourirro be this plant, his defcription is not fufficient to determine. He fays the petals are linear.

5. T. mucedora. Pointed Tamarik. —Stamens eight or ten. Spikes lateral and terminal. Leaves fheeting, abrupt, pointed. Bracteas taper-pointed, lanceolate. —The fpecimens of this very diftinct species, in the Linnean herbarium, have
have no mark by which we can ascertain its native country, though we suspect it to have been sent from the East Indies. The jointed appearance of the young branches, and the sheathing abrupt form of the leaves, approach those of T. articulata; but the leaves have much more elongated and tapering points, and every part is twice the size of that species. The foliage moreover is much less evidently dotted. Flowers large, fuscile, with lanceolate, membranous-edged bracteas, whose points are longer than the calyx, and very slender. Segments of the calyx elliptical, obtuse, flat. Petals obovate. Stamens eight or ten, we cannot be certain which is their general number. Capsules primative, glaucous, three-quarters of an inch long. Seed-down long and feathery.

6. T. songarica. Songarian Tamarisk. *Pallas Nov. Act. Petrop. v. 10. 374. t. 10. f. 4.* Wild. n. 3.—*Stamens eight or ten. Flowers axillary, somewhat spikid. Leaves lefthy, obtufc, triangular.*—Gathered by Pallas, in a falt soil, on the banks of the Songari. We know nothing of this species but from Willdenow. The "triangular blunt leaves" indicate an effenial difference from the lat.

7. T. germanica. German Tamarisk. *Linnae. Sp. Pl. 387. Wild. n. 3. Ait. n. 2. Fl. Dan. t. 234. Mill. t. 262. f. 2.* Pall. Rofs. v. i. p. 73. 1. 80. (Tamaricus germanica; Ger. Em. 1378. Lob. Ic. 218. Myrica; Camer. Epit. 74. f. 2.)—Stamens ten, monadelphous. Clusters terminal. Leaves linear-lanceolate, fuscile, obtuse.—Native of swamps in Germany, Siberia, Switzerland, and the mountains of Dauria and Caucaus. Common in our gardens, where it flowers in the open air from June to September. Mr. Atton says, on Hakluyt's authority, that this was the species introduced by archbishop Grindall; see T. Gallica. Gerard speaks of both as prospering well in the English gardens. The present is a more upright and glaucous shrub than the Gallica, as well as larger in all its parts. Leaves fuscile, imbricated, channelled, dotted, entirely pointless, not dilated at the base. Bracteas ovate, pointed, with membranous edges. Segments of the calyx ovato-lanceolate, likewise membranous at the sides. Petals obovate, fuscule-coloured, not much longer than the calyx. Capsule glaucous, the size and shape of our T. mucronata. Seed-down long and finly feathery.

Pallas figures what he conceives to be an annual herbaceous variety of this species, of which, not having seen it, we do not feel ourselves competent to give an opinion.

TAMARIX, in Gardening, furnishes plants of the hardy, deciduous, tree and shrub kinds, of which the species that are cultivated are, the French tamarisk (T. Gallica); and the German tamarisk (T. germanica).

Though the thir in its native situation grows to a tree of middling fize, in this climate it seldom rife more than four-teen or fifteen feet high, sending out many fnder branches, most of which spread out flat, and hang downward at their ends, being rather of a shrubby nature. It is prevalent in the south of France, and in other southern countries.

But the second species is rather a shrub than a tree, having several wody flaxk arising from the fame root, which grow quite erect, sending out many side branches, which are also erect. It is found in many parts of Germany, &c.

Method of Culture.—All these plants may be increafed either by laying down their tender shoots in autumn, or by planting cuttings in an east border, which will take root in a fhort time, if they are supplied with water in the spring, before they begin to shoot in dry weather; but they Should not be removed until the following autumn, at which time they may be either placed in a nursery, to be trained up two or three years, or where they are designed to remain, mulching their roots, and watering them according as the season requires, until they have taken root; after which, the only culture they will require is to prune off the fraggling shoots, and keep the ground clear about them.

The layer method is not only tedious, but unnecessary, as the cuttings grow readily, and the layers often will not strike at all. The cuttings should be of the leaf summer's shoots, and a moit border is most proper for them. In two years they will be good plants for the shrubbery, and may be planted out in almost any foy, though they like a light, moit earth bed, especially the latter fort, which grows naturally in low wetary situations.

Both these plants are of a rather hardy nature, and beautiful in their foliage and fine spikes of flowers. They will succeed in almost any fort of soil and situation.

They are very ornamental in the shrubbery borders, clumps, and other parts of grounds.

The former forts has likewise been lately recommended as a beneficial plant for forming quick or living hedges with, in such situations as are exposed much to the sea-air and blasts, as it has been found to fland such exposures remarkably well, where not affected by the winter frosts, of which it is rather impatient. See Quick Hedges, and TAMARISK-Plant.

TAMARUS, in Ancient Geography, a river of the ifle of Albion, which still retains its ancient name, being called Tamar, from Tamra, a gentle river; and its mouth is Plymouth haven.

TAMASA, or TAMASI, in Hindu Mythology, is a name given to the goddess Parvati, in her black character; the word meaning blackknfs or darkknfs. The name of Tamas, or Tamafa, was given to a dark, gloomy, atronomical character, called Rahu, (fee that article,) and Ketu, the names severally of the dragon's head and tail, or the afcending and defcending nodes of as trologers. One of the fons of Pava, the Hindu fire-king, is Likewise named Tamafa. (See PAVAKA.) Alfo one of thofe mythological, or historical perfonages, called Menus, of whom fee under Menu.

In the Sanscrit tongue, the root tam is prolific of derivations indicating properties of a dark, or gloomy, or malignant tendency.

TAMASA, in Geography, a river of Asia, in Mingrelia, which discharges itself into the Black Sea.

TAMASIDAVA, in Ancient Geography, a town fituated in the interior of Lower Media, at fome distance from the river Hieraus.

TAMASQU, in Geography, a town of Mexico, in the province of Gualfeca; 36 miles W.S.W. of St. Yago de los Vales.

TAMASSUS, in Ancient Geography, a town fituated in the interior of the ifle of Cyprus, W. of Ledra, on one of the freams which formed the Pedaus.

TAMATAMQUE, or Villa de las Palmas, in Geography, a town of South America, in the ifland of Granada, on the river St. Martha; 25 miles S. of Tenerife.

TAMATIA, in Ornithology, the name of a very fhrange bird of the Braldis. It is a species of Bucca in the Linnean fylum by Gmelin, and the spotted-bellied barbat of Latham.

Its head is very large; its eyes large and black; its beak is two fingers breadth long, and one broad, shaped somewhat like a duck's, but pointed at the end; its upper chap is black, its under one yellow; its legs are long, and the thighs in great part naked; its toes are long; its tail is very short; its head is black, and its back and wings of a plain duky brown; its belly is of the same brown, variegated with white.
TAMATMA, in Geography, a town of Africa, in the kingdom of Bornou.

TAMBA, a town of Africa, in the kingdom of Benguela; 165 miles E. of Benguela.—Allo, a town of Hindooflan, in Vindapour; 20 miles S.W. of Satterah.

TAMBA-AWRA, or Tamboaura, a town of Africa, in the kingdom of Bambouk, having in its vicinity a gold-mine; 108 miles S.E. of Gallam. N. lat. 13° 20'. W. long. 9° 25'.

TAMBAK or Tambaqua, a mixture of gold and copper, which the people of Siam hold more beautiful, and fet a greater value on, than gold itself.

Some travellers speak of it as a metal found in its peculiar mines; but upon what authority we do not know.

The abbé de Choisy, in his Journal of Siam, doubts whether this may not be the drummum, or amber of Solomon.

The ambassadors of Siam brought several works in tamba to Paris in the reign of Lewis XIV., but they were not found so beautiful as was expected. See Tambou and Gold-coloured Metal.

TAMBACH, in Geography, a town of Germany, in the principality of Gotha; 6 miles N.E. of Smalkalden.

TAMBAUCUNDA, a town of Africa, in the country of Woully; 50 miles E.N.E. of Medina.—Allo, a town of Africa, in the country of Neola; 52 miles W. of Baniferle.

TAMBERCHERRY, a town of Hindooflan; 18 miles N.E. of Calicut.

TAMBILO, a town of Peru; 56 miles N. of Oruro.

TAMBO, a town of South America, in the province of Popayan; 12 miles W. of Popayan.—Allo, a town of Paraguay; 250 miles E. of Assumption.

TAMBO de Oroes, a town of Peru, in the diocese of Cuyo; 156 miles N.W.W. of Cuyo.

TAMBONA, a town of Hindooflan, in the country of Travenacon; 40 miles N.E. of Travenacon.

TAMBOOKIES, a people of the colony of the Cape of Good Hope, situated N.E. of the Koufis, or the Kooftis, N. to the Orange river and tropic of Capricorn, are sup- posed by Mr. Barow to be of Arabian extract, as they widely differ from the Hottentots and the Negroes, and are acquainted with the smelting of iron, and some other rude arts. He conceives that a belt of this race spreads across to the Atlantic. The Demorans on the Copper mountains are Kofnis; and their country is so barren and sandy, that they cannot keep cattle. The Orange river, called the Groot or Great river, seems to rise about S. lat. 30°. E. long. 28°, and passes W. by N. till it falls into the sea between the Great and Little Nemaks. It has high cataracts and inundations like the Nile. On the shores are car- enians, caleedonias, agates, and variolites. See Orange- River.

TAMBOPELLA, a town of Peru, in the diocese of Arqueipu, at the mouth of the Nombre de Dios; 48 miles S. of Arqueipu. S. lat. 17° 10'.

TAMBO, in Peruvian Antiquity, buildings placed at certain distances, for the lodging of the princes of that country, in their travels through their dominions. See M. de la Consamime, in Mem. de l'Acad. de Berlin, tom. ii. p. 435; who tells us (p. 438.) that he saw several remains of these tambos, in his journey from Quito to Lima.

TAMBOV, in Geography, a city of Russia, on the Tara, capital of a government, and site of a bishop; 228 miles S.E. of Moscow. N. lat. 52° 48'. E. long. 41° 4'.

TAMBOUR, in Architecture, a term applied to the Corinthian and Composite capitals, as bearing some resemblance to a drum, which the French call tambour.

Some choose to call it the vase, and others campana, or the bell.

TAMBOUR is also used for a little box of timber work, covered with a ceiling, with the porch of certain churches; both to prevent the view of perfumes puffing by, and to keep off the wind, &c. by means of folding-doors, &c.

TAMBOUR also denotes a round form of stone, several of which form the shaft of a column, not so high as a diameter.

TAMBOUR, in the Arts, is a species of embroidery. The tambour is an instrument of a spherical form, upon which is stretched, by means of a string and buckle, or other suitable appendage, a piece of linen or thin silkén stuff; which is wrought, with a needle of a particular form, and by means of silken or gold and silver threads, into leaves, flowers, or other figures.

TAMBOUR, Fr., a drum; from which.

TAMBOUR De Basque, a small drum used by the Biscayans as an accompaniment to the fife, or fife flute, a tabor and pipe.

TAMBOURIN, a French dance, much in favour formerly on the French stage in all the opera dances of Lulli and Rameau. The air is gay and in common time.

TAMBOURISSA, or Tambourissze, in Botany, Sonnerat's name for what is now called Mithridatea; see that article. The French appellation of this tree, Bois Tambour, or Drum-tree, might be supposed to allude to the lightness and hollowness of the wood, or to its use, were not this word evidently derived from the Madagascar name of the same tree, Ambora.

TAMBOVSKOE, in Geography, a government of Russia, bounded on the north by the government of Vladimir, on the east by the governments of Nizegorod, Penza, and Saratov; on the south by the government of Saratov; and on the west by the governments of Riazan and Voronez; about 200 miles in length, and from 80 to 100 in breadth. N. lat. 51° 36' to 52° 20'. E. long. 38° 30' to 43°.

TAMBRAX, in Ancient Geography, a town of Asia, in Hycania, which, according to Polybius, was large, and had a royal palace.

TAMBRAY, in Geography, a town of Hindooflan, in Travenacon; 60 miles N.N.W. of Anjenga.

TAMBO, a river of Spain, which runs into the Atlantic, near Muros, in Galicia.

TAMBUCO, or Tabuco, a town on the coast of the island of Celebes, situated in a bay to which it gives name. S. lat. 2° 50'.

TAME, a river of England, which rises near Winlow, in the county of Buckingham, and runs into the Thames at Dorchester, in Oxfordshire.—Allo, a river of England, which rises near Dudley, in the county of Stafford, and runs into the Trent, about 7 miles above Burton. Tame. See Thame.

TAMEGA, a river of Portugal, which runs into the Duero, 10 miles S. of Amarante.

TAMEGAN, a town of the island of Ceylon; 48 miles S. of Candi.

TAMERLANE, in Biography. See Timour.

TAMETAVE, in Geography, a town on the E. coast of Madagascar. S. lat. 18° 5'. E. long. 49° 41'.

TAMIA, in Ancient Geography, a town of the isle of Albion, in the vicinity of Banatia and Alata Cartra. Ptolemy assigns it to the Vacomagi.
The text is a dense block of text that seems to be a page from a book or a journal, discussing various geographical and botanical topics. It includes references to places, rivers, and plants, and seems to be from a historical or natural history context. The text is not easily readable due to its density and the style of writing which is typical of 19th-century scientific literature.
TAM


Gen. Ch. Male, Cal. Perianth in fix deep, ovato-danceolate segments, molt expanded in their upper part. Cor. none; except the calyx be fo considered, which we have recommended in a parallel cafe, see SMILAX. Stam. Filaments fix, fimple, shorter than the calyx (or corolla); anthers erect.

Female, Cal. (or Cor.) of one piece, bell-shaped, in fix deep, lanceolate, spreading segments, fuperior, deciduous. Nectary an oblong depression in the base of each segment, at the fide. Pil. Germen inferior, large, ovate-oblong, smooth; style cylindrical, three-cleft, the length of the calyx (or corolla); stigmas three, reflexed, emarginate, acute. Peric. Berry ovate, of three cells. Seeds two in each cell, globose.

Ed. Ch. Male, Calyx (or rather Corolla) in fix deep segments. Female, Calyx (or rather Corolla) in fix deep segments. Style three-cleft. Berry inferior, of three cells. Seeds two in each cell.

1. T. communis. Common Black Bryony. Linn. Sp. Pl. 1458. Willd. n. 1. Fl. Brit. n. 1. Engl. Bot. t. 91. Mill. Illutr. t. 89. (Bryonia nigra ; Ger. Em. 871. Vitis nigra ; Matth. Valgr. v. 2. 622. Camer. Epit. 988.)—Leaves heart-shaped, undivided. Native of hedges, woods, and bushy places, in the more temperate parts of Europe, as well as in the Levant. It is common in England, not in Scotland, flowering in June, and laden with bunches of scarlet berries in autumn, till rotten with wet and frost. Dr. Sibthorp found this plant frequent in Greece, as well as in the isles of Crete and Cyprus. The young sprouts boiled are eaten in the latter, like aparagus, to which they are naturally allied. The fleshy perennial root is blackish externally, whence the ancient, as well as English, name. Stems annual, herbaceous, branched, twining round every thing in their way, and thus climbing, without tendrils, to a considerable height, till they become elegantly pendant in feftoons. Leaves alternate, stalked, entire, acute, many-rubbed, smooth. Stipulas small, awl-shaped, spreading, in pairs at the base of each fettalk. Flowers in long, greenish, axillary clusters. Berries oval, the fize of a large currant, bright red, inipid. The root is acrid. Its pulp scurfed has formerly been used as a fculminating plantier.

2. T. elephantipectis. Tuberous Cape Black Bryony. L’Herit. Sert. Angl. 29. Ait. n. 2. Willd. n. 2. Curt. Mag. t. 1347.—Leaves kidney-shaped, undivided. Root elevated, corky and tefcellated.—Found at the Cape of Good Hope, near the town, by Mr. Maffon, who fent it to Kew in 1774. A male plant flowered there, in the fve, in 1783, from whence PHeritier caufed a drawing to be made, but this plate never appeared. A female, originally imported by Mr. George Hibbert, flowered in Mr. Knight’s greenhouse, and being published in the Botanical Magazine, has determined the genus, by its inferior germen, a point previously only gufeated at. The singular appearance of the great fleshy root, rifing out of the ground, a foot in diameter, and covered with angular, tefcellated, brown knobs, more re-embles the clumsy fhell of fome huge toftice, than an elephant’s foot. This uncoth mass fends forth in the spring a fnder, twining, annual flen, about eight feet long, not unlike the laft; but the leaves are very diftinct, kidney-shaped, with strong ribs; their ends either emarginate, or abrupt with a fmall point. Fottalks timid, or jointed, at each end.


3. T. cretica. Cretan Black Bryony. Linn. Sp. Pl. 1458. Willd. n. 3. Ait. n. 3. Sin. Fl. Græc. Sibth. t. 958, unpublished. (Tamus cretica, trifido folio ; Tourn. Cor. 3.)—Leaves three-lobed.—Not rare in the woods and hedges of Crete and Cyprus, as well as Greece. Sibthorp. Miller appears to have cultivated it in 1739, but we have never met with a plant in gardens, nor is this species likely to be a popular favourite. It differs from the firft chiefly in having a deep lateral sinus, on each fide of the leaves, and twin clufhers of flowers, one much longer than its companion. We know nothing of the fruit.—The young fhoots are eaten boiled.

TAMUSIDA, in Gardening, furnifhes plants of the hardy, herbaceous, climbing, perennial kind, among which the species most generally grown are the common black bryony (T. communs); and the Cretan black bryony (T. cretica). The firit fort has a very large tulerous root, which is blackish externally; the ftems are smooth, twining about every thing in their way, and thus ascending, without the aid of tendrils, to the height of ten or twelve feet in hedges or among bushes, which their fefions of tawny leaves and red berries decorate in the autumnal feafon.

But the fecdent species has a rounder root than the former; yet the falks twine in the fame manner.

Method of Culture.—All these plants are readily increased by fowing the feed soon after they are ripe, under the shelter of hedges, where, in the fpring, the plants will come up, and require no further care; or in beds to be afterwards planted out. The roots will abide many years, and fometimes fend up fuckers, from which plants may be raised by fetting them out in the autumn or fpring where they are to remain.

The thick fleshy root of the firft fort is fometimes cultivated for use in the shops. Both the plants are ufeful in thicketts, and in the wilder-ncs parts of pleafure-grounds.

TAMUSIDA, in Ancient Geography, a town of Africa, in Mauritania Tingitana, between Banafa and Silda.

TAMUSIGA, a town of Africa, in Mauritania Tingitana, on the sea-coast, between the port of Hercules and the promontory Ufadum.

TAMUZ, in Chronology, the fourth month of the Jewish ecclefialfical year, anfwering to part of our June and July. The 17th day of this month is oberved by the Jews as a fall, in memory of the deftitution of Jerusalem by Nebuchadnezzar, in the 11th year of Zedekiah, before Christ 588.

TAMWORTH, in Geography, is a borough and market-town, fettled partly in the hundred of Offlow, county of Stafford, and partly in the hundred of Hemlingford, county of Warwick, England: at the distance of 22 miles S.E. from Stafford, 27 miles N. by W. from Warwick, and 116 miles N.W. from London. It is fettled near the confluence of the rivers Tame and Aker, the former of which runs through the town, and divides it into two nearly equal parts. Tamworth appears to have been of considerable note at an early period; and was the occasional residence of the Merian kings. Oliva dates a charter to the monks of Worcester from his palace here in the year 781; and several of his succiffors in the next century also date their grants from the fame place. At that period, a ditch, forty-five feet in breadth, protected the town and royal demeane on the north, west, and east; the river serving as a defence on the south fide. Of this ditch, fome vestiges can ftil be traced, and at two angles which it forms, are two mounts, probably raised as foundations for towers. On the invasion of this kingdom
by the Danes, Tamworth was almost, or totally, destroyed. Etholda, the daughter of the illustrious Alfred, is said to have rebuilt it in 913, after the heresy and valour, freed her brother's dominions from the invaders. She also erected a tower on an artificial mount, which forms the site of the present castle; and here the generally united till her death, in 918. The castle was bestowed by William the Conqueror on Robert Marmon, whose descendants held it till Edward I., when it passed by marriage to the Frevile family; that of Fertres succeeded in the reign of Henry VI.; and they were followed by the Comptons. This venerable fabric is still in a good state of preservation, as to its exterior: but the inside has suffered much from age and neglect. The rooms are numerous, but ill-suited to the liberal domestic manners of the present era; and the whole is chiefly attractive as a monument of antiquity. The town of Tamworth is large and well-built. It was incorporated by queen Elizabeth on a scale peculiarly liberal: the corporation consists of two bailiffs, a recorder, high steward, under steward, a town-clerk, and twenty-four principal burgesses: one of the bailiffs is chosen from each county. Tamworth has sent two representatives to parliament ever since the year 1563. The right of election is in the inhabitants paying tax and lot: and the members are returned jointly by the sheriffs of Warwickshire and Staffordshire. The church is a spacious edifice. The most ancient portion exhibits two round-headed arches, embalmed with zick-zag mouldings: whence it seems probable that the original edifice was constructed soon after the Conquest. The church was rendered collegiate by the Marmon family at an early period for a dean and six prebendaries; with several lay prebendaries, which are still attached to the church. The college was granted by queen Elizabeth in 1581 to Edward Downing and Peter Ashton. An hospital was established in this town by Philip Marmon in the 15th year of Edward I. On its feite another was founded and endowed by Mr. Guy, to whom the borough of Southwark is indebted for the noble hospital which bears his name. A grammar-school, founded by queen Elizabeth, is still well supported. Here are some manufactures, which is of super fine woollen cloths; but this trade, though still respectable, has much decreased. The printing of calicoes, the tannery, the manufacture of flax, and the spinning of yarn, are branches of business which have considerably advanced. A weekly market, under queen Elizabeth's charter, is held on Saturdays: and three fairs annually. In the population return of the year 1811, the Staffordshire division of Tamworth was stated to contain 279 houses, and 1327 inhabitants; the Warwickshire division 325 houses, and 1666 inhabitants: making a total of 2993 persons, occupying 604 houses.

About four miles south of Tamworth is Pooley-Hall, the seat of the honourable col. Finch. The lands attached to this residence formed part of the possessions of the Marmons; and after several intermediate transactions, came to the family of Cokaine, in the latter part of the 14th century. It is ascertained that Sir John Cokaine resided at Pooley in the reign of Henry IV., and his descendants, for many generations, made it their principal seat. The present mansion was erected by Sir Thomas Cokaine, temp. Henry VIII., and is a fine but irregular building, varying in character between the embattled style of the thirteenth, troubled and fabulous ages, and the open amplitude of construction then first growing into practice. —Beauties of England and Wales, vol. xii. Staffordshire, and vol. xiv. Warwickshire, by J. N. Brewer.

Tamworth, a town of America, in New Hampshire; 56 miles N. of Portsmouth; containing 1344 inhabitants.

Tamyraca, in Ancient Geography, a town of European Sarmatia, near the Cercinute guller. 

Tan, the bark of the oak, chopped, and ground by a tanning-mill into a coarse powder; to be used in the tanning or dressing of skins. See Tannin.

New tan is the most esteemed; when old and flake, it loses a great deal of its effect, which consists in condensing or closing the pores of the skins; so that the longer the skins are kept in tan, the greater strength and firmness they acquire.

This bark, which is more abundant in the gummy region part than any of our common indigenous astringents, and which, on account of its astringent, gummy, reftless property, serves both to preserve leather from rotting, and to render it imperious to water, is preferred to all other substances for the purpose of tanning. It is used either in the way of infusion, which is called ooze; or the dry powder is flowed between layers of hides and skins, when these are laid away in the tan-pits. The ooze is made by macerating the bark in common water, in a particular set of holes or pits, which, by way of diffusion from the other holes in the yard, are called latches. See Tanning.

Every part of the oak-tree, of what age or growth soever, is fit for the tanner's use, and all oak coopeere-wood, of any size or age, being cut and procured in barking-time, will tan all sorts of leather; at least, as well as the bark alone. When this material is got at the proper seafon, it must be very well dried in the sun, more than the bark alone; thence it is to be cut up, and preferred in a covered place for use.

When it is to be used, the greater wood must be first cleft small, to fit it for the beating and cutting-engine; and the smaller must be put into the engine as it is: which done, it must be again dried upon a kiln, and after that, ground in the same manner that the tanners grind their bark. Such wood as is to be used presently after it is gotten, will require the better and the more drying upon the kiln; and if this is omitted, it will blacken and spoil all the leather it is used about. Where oak is scarce, black-thorn, or hax-tree will tolerably well supply its place: and where that is not to be had in sufficient plenty, the white-thorn will do.

Phil. Trans. N° 108.

Birch also, being ordered in the same manner with oak, is fit for some uses in tanning, particularly it does very well for tanning of shoe-sole leather. All these ingredients will tan much better than bark alone; and that with much less charge; so that this discovery may very well save the felling of trees when the bark is wanted, at a seafon when the fap is up, which, when it is done, causes the outside of the tree to rot and grow worm-eaten; whereas, if the trees had been felled in winter, when the fap is down, they would have been almost all heart, as the people express it, and not subject to worms. This manner of using the wood with the bark, in tanning, will also increafe the value of underwood very considerably. Phil. Trans. N° 105.

The engine necessary for cutting the wood consists of a large square wooden block, and some pieces of iron to be fastened on and used about it, &c. a hammer, an ax, an iron holding the wood to be bruised and cut, and a knife to cut it. The whole is a very simple and cheap machine, and is described at large, and figured in the above-mentioned number of the Philosophical Transactions.

By M. de Buffon's experiments upon different skins, it was found that a decoction of young oak-wood succeeded perfectly well in tanning sheep and calves' skins, but did not
not do equally well for ox, and the other harder skins. This, however, he imagines, might be only for want of knowing the best method of using the wood. And certainly these trials defer to be farther proected; since the small branches of the oak, which are of little value, might be thus made to supply the place of a much dearer commodity, the bark; and as in many trees the bark of the young branches is found to be of greatly more virtue than that of the larger branches, or the trunk, the use of these small boughs, bark and all, might very probably be found to answer to all the effects of the bark of the larger kind alone. Memoirs Acad. Scienc. Par. 1736.

The Society of Arts, &c. granted a premium of 100l. in the year 1765, for the discovery of a method of tanning with oaken saw-dust; but the acquisition has not hitherto had its desired effect; though it is laid that the use of oaken saw-dust has been advantageously adopted in Germany. Doffie's Mem. of Agr. vol. i. p. 227.

We are told, in Phil. Tran. No. 36, that the operation of tanning is performed, on leather, better in the Wilt Indies than in England. They use three sorts of bark, the mango-bark, the olive-bark, and another; and the whole bullines is to soon done, that a hide delivered to them, is in six weeks ready to be worked into shoes, though they bellow less labour than we do.

Mr. Albert Gfner, first physician to the duke of Wirtemberg, having made some experiments on the duft of heath, dried in an oven, and afterwards pulverized, as a sub- stitute to that of oak-bark in tanning, found that the leather prepared by this method was very good; but he observes, that the operation is much more tedious. (Hist. R. A. S. Paris, for 1756.) Others have proposed a trial of the small branches of heath, and the leaves of oak.

TAN, in Gardening, asubstance of the oak-bark, or other similar kinds, after it has been ground and soaked in the ooze of the tanners' vats, and properly dried, is used for the purpose of making hot-beds, for forcing many sorts of exotic plants that require a durable steady heat.

It has not been of very long use in England, and was brought to us from Holland in the reign of king William, and then used for the raising of orange-trees; but after this period it became diffused; and it is of a much later date, viz. about the year 1719, that it has been brought into use again for the raising of the pine-apple, since which time it is become generally used, wherever it is to be had, for all the purposes of the hot-bed, in raising tender exotic plants.

Refuse tan, made up into cakes, serves as fuel, in circumstances where a gentle and continued fire is advantageous. See Bark-Bed, Hot-Bed, Hot-House, and Stove.

TAN, Flower of, is a name given by the people employed in the tanning-trade, to a yellow sublimate, often found upon old tan, or oak-bark broken to pieces, which has been used as tan, and is of no farther service.

The name, however, is very improper; and though every body conversant in tan-yards must have seen the thing, yet it has always passed as an eflence of the bark, till the curious Mr. Marchand inquired more accurately into its nature, and found it to be a plant of itself, wholly different from the matter of the tan; and to which the bark, which had been often wetted and dried again, served as a proper matrix. He found it to be more nearly allied to the spunge, than to any other genus of plants, and therefore named it Fungia fugax mollis flavo & amena in pulvere corticato safient, soft, beautiful, yellow-fading spunge, growing on tanners' bark.

It makes its appearance most frequently in the summer-


5. **T. uliginosum.** Marsh Levant Taney. Prodr. Fl. Græc. n. 2029. Fl. Græc. t. 855, unpublished. (San-tolina variegata erecta; Tourn. Infl. 461.) — Leaves linear; the lower ones with one lateral tooth. Stalks foliary, terminal, single- or double-flowered. — Gathered by Dr. Sibthorp in boggy parts of the isle of Cyprus, intermixed with Juncus bufcinus. The root is annual, simple, tapering, with many white fibres. Stems several, ascending, branched from the bottom, three or four inches high, round, smooth, leafy. Leaves alternate, feffile, an inch long, acute, channelled, smooth, mostly entire; a few of the lower ones only dilated slightly at the end, and furnished with a lateral tooth. Flowers terminal, foliary, yellow, hemispherical, each on a simple, naked, smooth, erect stalk, two or three inches in length, purplish at the top. Seed, according to Mr. Bauer’s drawing, crowned with an oblong tubular scale, spilt on one side.

6. **T. fassifloratum.** Shrubby Cape Taney. Linn. Sp. Pl. 1183. Wild. n. 5. Ait. n. 2. Thunb. Prodr. 146. (T. africanaum forstiansum multi forsonum, folis tanaceti vulgaris decuplo minoribus; Comm. Hort. v. 2, 193, t. 100.) — Leaves in many, pinnate, subdivided, acute, somewhat downy segments. Stem shrubby. Flowers corymbose, level-topped. — Native of the Cape of Good Hope, from whence the Dutch obtained seeds above a century ago, and which probably found its way into our more curious green-houses. The plant has little to attract general admiration, though the leaves are delicately divided, and the leaf branches are terminated by abundance of little golden corymbose flowers, whose calyx is membranous and lining.

7. **T. floricorn.** Long-leaved Siberian Taney. Linn. Sp. Pl. 1183. Wild. n. 6. (T. n. 116; Gmel. Sib. v. 2, 134, t. 65, f. 2.) — Leaves pinnate; leaflets linear-thread-shaped, entire; undivided or three-eleven. Flowers corymbose, level-topped. Calyx-scales nearly orbicular, smooth. — Gathered by Steller, in dry mountainous parts of Siberia, beyond the lake Baical, flowering in June and July. The root is brown, rather thick, with many fibres running deep into the ground, and apparently perennial. Stems about eighteen inches high, erect, round, striated, smooth, somewhat leafy; branched and corymbose at the top. Leaves acute, not unlike those of Southernwood, but smooth; the lower ones on long stalks; the uppermost seffile, at the base of each branch. Flowers bright yellow, partly drooping, encompasied by the white membranous edges of the green orbicular scales of the calyx.

8. **T. argentatum.** Silverly Armenian Taney. Wild. n. 7. (T. albo filicula; Linn. Sp. Pl. 1183. Wild. n. 10. — Leaves deeply pinnatifid, pointed, hairy, dotted. Stem much branched. Flowers somewhat panicked. Calyx-scales elliptical, nearly equal. — Native of the Cape of Good Hope. Root somewhat woody, with many fibres; Linnaeus judged it to be annual. Stem about a span high, copiously branched, round; branches ascending, leafy, hairy. Leaves numerous, scattered, flattened, hardly an inch long, in even or nine deep, acute, entire segments, clothed, on the lower side at leaf, with very long, fragrant.
Tanacetum.

Fragrant loose hairs. Flower-flalks panicked, hairy, leafy, somewhat corymbose. Flowers small, hemispherical, rather convex, yellow, with few or no radiant florets. Calyx-segments acute, rather lax, roughish, with thin pale edges.

13. T. orientale. Silky-leaved Oriental Tansy. Willd. n. 11. (Achillea orientalis incarnata, capillago folio, floribulus in capitulum congestis; Tourn. Cor. 34.)—"Leaves silky and hoary; the radical ones pinnate; leaflets in three deep, linear- thread-shaped, acute segments; stem-leaves in three deep, lanceolate segments. Panicle densely corymbose.

Native of Armenia. Root perennial. Leaves of the root and barren stems about three-quarters of an inch long, on filf longer footstalks; those of the flowering stem broader, their segments flat, occasionally divided. Panicle corymbose, terminal. Flowers sessile, in round heads, upon crowded flalks. Calyx downy. Receptacle naked. Willd. 14. T. annuum. Annual Tansy. Linn. Sp. Pl. 1184. Willd. n. 12. Ait. n. 3. (Santoliana corymbis simplicibus, faltigiatis, folis linearibus confertis; Mill. Ic. t. 227. f. 1. Eichryson; Clus. Hist. v. 1. 326. Elyochryson, five Cama aures; Ger. Em. 645.)—Radical leaves doubly pinnate; those of the stem deeply pinnatifid, downy; their segments sharp-pointed. Coryrams level-topped. Calyx-segments oblong, hairy.—Native of Spain and Italy. Very soon introduced into our gardens, where it proves a hardy annual, flowering in July and August. The stem is two or three feet high, round, furrowed, much branched, clothed with innumerable small crowded pinnatifid leaves, of a rather hoary green. Flowers yellow, in terminal flat corymbs; the leaflets of their calyx unequal, imbricated, keeled, hairy, tipped with a rounded membrane.


16. T. grandiflorum. Large-flowered Cape Tansy. Thunb. Prodr. 147. Willd. n. 14.—"Leaves doubly pinnate, villous; leaflets linear, acute. Heads of flowers solitary, downy."—From the same country.—We have not seen either of the two last species. Willdenow understands Thunberg's expression, capitula solitaris, as meaning floribus solitaris; but the supposition of so great an inaccuracy is fearfully warranteable. We therefore prefer the original sense; whether it be accurate or not must remain with the author.


18. T. myriophyllosum. Milfoil Tansy. Wild. n. 17. "Eufd. Achill. 50." (Achillea bipinnata; Linn. Sp. Pl. 1205. Pteramnica orientalis incana, folis pennatis, semilongifolius floribus vix conficiens; Tourn. Cor. 38.)—Leaves doubly pinnate, downy; leaflets ovate; those of the stem toothed; of the radical leaves entire.—Native of the Levant. Only to be seen perhaps in Turin, or in collections extracted from them.

19. T. vulgare. Common Tansy. Linn. Sp. Pl. 1184. Willd. n. 18. Ait. n. 4. Fl. Brit. n. 1. Engl. Bot. t. 1229. Woodv. Med. Bot. t. 115. Fl. Dan. t. 871. (Tanacetum; Ger. Em. 650. Matth. Valgr. v. 2. 259. Camer. Epit. 650.)—S. T. crispum anglicum; Ger. Em. 650.—Leaves doubly pinnatifid, sharply serrated, naked.—Native of banks, hedges, and borders of fields, in most parts of the middle of Europe; very frequent in England, flowering in July and August. Root perennial, creeping. Herb two feet high, leafy, dark green, with a strong balsamic scent, and bitter taste. It was formerly more used than at present to give a flavour, as well as a green colour, to a rich kind of pudding. The leaves are copious, soft, a span long, sometimes a little hairy underneath; clasping the stem with their dilated base. Flowers composing a large, flat-topped, terminal, golden corymbs. The rays is fearfully remarkable but in hot seasons, though its rudiments may generally be detected. The curled-leaved variety is esteemed most aromatic and wholesome.

Willdenow's fifth species, T. monanthos, Linn. Mant. 84. having a fealy receptacle, is referred to Santolina, (see that article,) in the Prodr. Fl. Graeca, by the specific name of S. rigida. This is a deprefed annual plant, with doubly-pinnatifid pointles leaves; single-flowered ascending hairy flalks; and a hairy calyx, whose leaflets are nearly equal. The flowers are yellow. This is a native of Cyprus, and very nearly akin to S. anthothecae, Linn. Sp. Pl. 1180; whose calyx is imbricated on all sides, and its leaves have bristle-pointed segments.

Tanacetum, in Gardening, furnishes plants of the herbaceous and shrubby perennial kinds, among which the species most commonly cultivated are, the common tansy (T. vulgare); the annual tansy (T. annuum); the California tansy (T. balsamita); the Siberian tansy (T. fibri- cum); the shrubby tansy (T. suffruticosum); and the fanned tansy (T. fabelliforme).

In the first sort there are varieties with curled leaves, called double tansy; with variegated leaves; and with larger leaves, which have little scent.

Method of Culture.—All the different herbaceous species are increased by parting the roots, and by seed.

In the first mode the business is effected by felling or dividing the roots in autumn or winter, when the flalks are decayed; or early in spring, before new flalks shoot forth; planting the plants at once where they are to remain; those for the kitchen-garden, as the common tansy, &c. in any bed or border a foot and a half in diameter, and those intended for variety in the pleasure-ground, singularly here and there, at suitable distances, to effect a proper diversity.

The seed sown in autumn should be sown in the spring following, in beds of light earth, broad-cast and raked in; when the plants will soon come up, and in July be fit to prick out in beds, in rows a foot or two; some to remain, and others to be planted out in autumn where they are to grow.

All the shrubby sorts are easily increased by cuttings of the branches, which should be planted any time in spring and summer, choosing the young and most robust shoots, which should be cut off in proper lengths, and if early in spring, &c. be planted in pots of good earth, several in each, plunging them in a hot-bed, where they will be rooted, and fit for potting off separately in six weeks; or in summer, the young shoots may be planted in the full ground, in a shady border, or where they may be shaded with mats from the sun; or in pots, placed in the shade, or under a garden-frame, &c. in all of which methods, giving plenty of water, they will readily take root; but those in the hot-bed will be forwarder; they, however, will all be well rooted the same season, and should then be transplanted into separate pots, and managed as other shrubby greenhouse plants. See Green-House Plants.

Most of the former sorts require to be afterwards kept free from weeds, cutting down the decayed flalks annually in autumn; and as the roots increase fast into large bunches, spreading
spreading widely round, they should be cut in, or be flipped occasionally, otherwise they are apt to overrun the ground; and to have the ground dug between the plants annually.

All the latter sorts are somewhat tender, but only require shelter from frost, being kept in pots, and deposited among the greenhouse plants, and treated as other shrubby exotics of that collection. They effect a very agreeable variety at all times of the year, but particularly in summer and autumn, when in flower.

The common tansy has been long cultivated in the garden as a culinary and medicinal herb; the leaves being used occasionally, while young and tender, in salads during the spring season, as well as for making cakes, puddings, and many other similar articles. The powder of the dried leaves, the seeds, and the flowers, have also been sometimes employed as a remedy against worms.

The curled and variegated sorts or varieties are principally made use of for ornamental purposes.

The Earl of Dundonald has proposed the cultivation of the tanacetum, or tansy, for the production of potats, affording that it will yield more of this alkalai than can be procured from an equal weight of any other vegetable.

TANACETUM, in the Materia Medica. See TANSY.

TANADASSA, in Ancient Geography, a town of Africa Propria, on the route from the Grand Leptis to Tacepe.

TANECIUM, in Botany, is named by Dr. Swartz, on account of its very long climbing stem and branches, from TANECIUM, stretched out, or rather having an elongated point.


Gen. Ch. Cal. Perianth inferior, of one leaf, tubular, undivided, abrupt, nearly or quite entire. Cor. of one petal, long; tube cylindrical, dilated upwards, limb spreading, in five, somewhat unequal, or two-lipped, deep segments. Stam. Filaments four, shorter than the tube of the corolla, two of them rather shorter than the rest, with an intermediate rudiment of a fifth; anthers two-lobed. Pfll. Geren superior, roundish, fruited on an annular receptacle; stye ample, about the length of the flaments; stigma of two thick spreading lobes. Peric. Berry very large, globose or oblong, on a short stalk, of two cells, with a hard coat. Seeds small, numerous, oblong, angular, inferted into a central globose receptacle.


Obs. This genus surely belongs to the Luride of Linnaeus, and is considered akin to another genus of Swartz’s, the SOLANDRA, see that article, though he does not appear to advert to this affinity.

1. T. parafficum. Simple-leaved Tanacem. Wildl. n. 1. Swartz Ind. Occ. 1053. Jacq. Hort. Schoenbr. v. 1. 61. t. 115.—Leaves simple, ovate, coriaceous. Stem shrubby, climbing parasitically.—Native of woods in the western part of Jamaica. Stem when young closely attached to fibrous radicles to the trunks of trees, round, with a grey rugged bark; when full-grown, it often decays below, supporting itself altogether parasitically, and sending out round, spreading, smooth, leafy branches. Leaves opposite, on short thick stalks, five or six inches long, entire, acute, scarcely pointed, smooth, of a fine shining green, with one rib, and many oblique veins.

Flower-stalks axillary, short, each bearing about four elegant drooping flowers, about an inch and a half long. Calyx swelling, purplish-red, contracted at the mouth, quite entire. Corolla with a pale yellow tube, and crimson, spreading or reflexed, border, whose segments are rounded, and nearly uniform, the lowermost only a little the largest, and folding over the mouth like a lid, before the flower expands. Berry globose, as big as a small apple, with a brown brittle coat. Swartz once found a fruit with three cells.

2. T. Joroba. Three-leaved Tanacem. Wildl. n. 2. Swartz Ind. Occ. 1050. t. 20. f. 1. (Joroba; Maregr. Bractil. 25. Pis. Brazil. 173. Curcurbitifera fruticosa trifolii scandens; Solono Jam. v. 2. 175.)—Lower leaves ternate; upper in pairs, with an intermediate terminal tendril. Stem climbing.—Native of woods, on the banks of rivers, in the western part of Jamaica. Swartz found it in flower in February, climbing to the top of a tree of the Bignonia lunesylon. The shrubby stem mounts to a great height, where it has an opportunity of support, sending out long, pendulous, round, slightly fringed, herbaceous branches. Leaves opposite, equal, more than three ovate, pointed, entire, ribbed, smooth, scarcely coriaceous, leaflets, each half a foot long; upper of two rather smaller ones, with a slender rigid tendril in the place of a third leaflet, by which the branches are supported on the top of the neighbouring trees. Clusters axillary, of few flowers, with thick, round, opposite stalks. Flowers white, short-lived. Calyx gibbous at the base; sometimes very minutely five-toothed at the margin. Corolla funnel-shaped; its tube six or seven inches long, swelling at the top, downy both within and without; segments of the limb ovate, wavy or plicated, about three-quarters of an inch in length, all nearly equal, though the two uppermost are, as in the former species, less deeply separated. Berry very large, a foot long, oval, pendulous, smooth, brittle when ripe. Seeds large, broad, compressed, lying closely over each other. The Portuguese call this plant Cala amarogata, on account of its bitterness.

3. T.? pinnatum. Pinate Tanacem. Wildl. n. 3. (Crescentia pinnata; Jacq. Coll. v. 3. 203. t. 18.)—Leaves pinate. Stem arboreous, erect.—Native of Mozambique, where it is called Kigeliika, and from whence it was carried to the islands of Mauritius or Bourbon, and thus got into the imperial gardens at Schoenbrunn, being accompanied by a dissected drawing of the flower, which is all that Jacquin has exhibited of the plant. The young tree, about seven feet high, and four inches in the diameter of its trunk, bore in the flow several branches, with alternate pinate leaves, each of four pair of oblong leaflets with an odd one, all coriaceous, obtuse with a point, undulated, sparingly and sharply serrated; smooth above; rougher on the touch beneath; the largest nearly six inches long; the odd one on a considerable partial stalk. The flowers are said to grow on the trunk and older branches, but of their mode of fruition or inflorescence we have no account. The calyx is ovate, tubular, smooth, pale-green, about an inch long, with five acute, rather deep, red segments. Tube of the corolla cylindrical, pale, the length of the calyx; limb very large, bell-shaped, three inches long, with five acute, unequal, reflexed, marginal lobes; its outside strongly and copiously ribbed, pale, with a tinge of red; the whole infi de a fine crimson. The fifth flamen is apparently perfect, with an anther, though but half the length of the others; all the filaments hairy. Germin accompanied at the base by five glands. Stigma of two lanceolate plates. Berry as large as a man’s head, coated, full of pulp, in which the seeds are lodged.—Jacquin was doubtful of the genus of this magnificent...
TAN

TANAEIM, or TANAEM, in Geography, a town of Arabia, in the province of Yemen, famous among the Arabian Jews, who had anciently their chief seat, and many considerable synagogues in it; at present it is almost depopulated; 30 miles S.E. of Sana.

TANAGA, one of the Fox islands, in the North Pacific ocean, about 40 miles in circumference. N. lat. 53° 20'; E. long. 182° 14'.

TANAGER, II. fiu;e Negro, in Ancient Geography, a river of Italy, in Lucania, according to Virgil. It has its source in a mountain called Albussus, now Monte Pogliano, and discharges itself into the Silanus.

TANAGRA, a considerable town of Bocotia, towards the west, seated on an eminence, at some distance from the mouth of the Afopus. In a temple of Bacchus at this town was a fine statue of this god, and above, a triton of admirable workmanship. Beside the temple of Bacchus, here were temples of Themis, Venus, Apollo, and Mercury. In the most conspicuous part of this city was the tomb of Corinna, so famous for her beauty and poetical talents, so that at Thebes she gained a prize in preference of Pindar. Here was also the tomb of Orion. Pausanias.

TANAGRA, Tanager, in Ornithology, a genus of the order Passeres; the characters of which are, that the bill is cone shaped, acuminate, emarginated, subtrigone at the base, and inclining at the apex. Gmelin enumerates forty-six species.

JAGAPA. Black; the forehead, neck, and breast, crimson-coloured. This is the jacobus of Marcgrave, the red-breasted blackbird of Edwards, and the red-breasted tanager of Latham. It is found in America.

BRASILIA. Crimson, with black tail and wings. This is the cardinal of Buffon, and the Brafilian tanager of Latham. Found in South America. Of this bird there are two varieties, one of which is the rumpless blue, red, and black Indian sparrow of Willughby.

RUBRA. Red, with black wings and tail, and tail-feathers white at the apex. This is the Canada tanager of Pennant, and the red tanager of Latham. Found in Canada. Of this the scarlet fork of Edwards, or merula brafiliensis of Ray and Willughby, is a variety.

JACARINA. Violet-black, with wings white beneath, and tail of two divericated branches. This is a bird of Brafil and Guiana, the jacarini of Marcgrave.

VIOLA. Violet, and the under part very yellow: the teiti of Marcgrave, the golden titmouse of Edwards, and golden tanager of Latham. A variety of this, found in Brafil, Surinam, and Cayenne, is shining black, with the abdomen, breast, and front pale yellow, and the outer tail-feather having on its inner side a white spot.

OLIVACE. Olive; the throat and breast yellow, the abdomen white, the quills and tail-feathers brown, with a white margin. This is the olivet of Buffon, and found in Cayenne.

GYROLA. Green, red-headed, yellow collar, and ceruleous breast: the rouvardian of Buffon, the red-headed green-finch of Edwards, and red-headed tanager of Latham. Found in various parts of South America.

CAYANA. Yellow, green back, red cap, and black checks. A bird of Cayenne, of which there is a variety, underneath golden-coloured, back green and yellow, head ceruleous, wings and tail green.

ATKATA. Shining black: the black tanager of Latham. Found in India.

MEXICANA. Black, underneath yellowish, breast and rump blueish: the black and blue titmouse of Edwards, and black and blue tanager of Latham. The tangara barbadensis cerulea of Buffon is a variety. Found in Cayenne, Guiana, and New Spain.

TATAO. Violet, black back, yellow rump, green head, and violet breast and wings: the titmouse of paradise of Edwards, the paradise tanager of Latham, and the tangara of Buffon, Ray, Willughby, and Buffon. Found in Guiana.

ALIHOSTIS. Black, with a spot on the wings, and tail yellow, and a white beak: the white-billed tanager of Latham. Of this there is a species. It is an American bird.

GULARIS. Black, beneath white, red head, and purple throat: the rouge-cap of Buffon, and red-headed tanager of Latham. Found in Cayenne and Guiana.

CAYENNESSIS. Black, both sides of the breast and under part of the wings yellow. Found in Brafil, Guiana, and New Spain.

BRASILIENSIS. Black, under part white, throat and rump blueish, face and breast black: the guira-genioa of Marcgrave, the turquin of Buffon, and turquois tanager of Latham. A Brafilis species.

DOMINICA. Black-spotted, above brown, and below white: called from the place of its residence, by Latham, the St. Domingo tanager.

MILITARIS. Brown; breast, neck, throat, and shoulders fanguous: the military tanager of Latham, and greater bufinch of Edwards. Found in South America.

GRISEA. Grey-olive, under grey, long and white and tail black, grey at their margin. Found in Guiana and Louisiana.

EPISCOPUS. Cinereous, with wings and tail externally blueish: the bishop tanager of Latham. Found in Cayenne.

SAYACA. Hoary, with blueish wings: the sayaca of Marcgrave. Found rarely in Cayenne.

PUNCTATA. Grey, pointed with black; under yellowish-white: the sayaca of Buffon, spotted green titmouse of Edwards, and spotted tanager of Latham. Found in Cayenne.

VIRENS. Green, under yellowish, cheeks and throat black: the green tanager of Latham. Found in New Spain, Peru, and Brasil.

MISSISSIPPIENSIS. Wholly red: the Mississippian tagoner of Latham. Of this species there are two varieties; one found on the river Mississippi, and the other in New Spain.


MAGNA. Olive-brown; under reddish; legs, front, and temples blueish; vent-feathers and throat red, and the middle of the throat white: the grand tanager of Latham. Found in Guiana and Cayenne.


VARIABILIS. Green, partly blueish and partly brown, black band about the eye, quills and tail-feathers black, with green margins: variable tanager of Latham.

Tricolor.
Tricolor. Green; head, chin, throat, and breast pale
fe-colour; black neck-band, head and sides of the neck
golden-green, a large spot on the throat, and back black,
the breast-band blueish, the abdomen and vent-feathers
yellowish-green: the green-headed tanager of Latham. Of
this there is a variety.

Guanensis. Head, chin cinerine-grey, front and
head-band on both sides from the front to the nape red: the
grey-headed tanager of Latham. Found rarely in the forests
of Guiana.

Nigrifrons. Olive, beneath yellow, black throat,
golden breast, feathers of the wings and tail-feathers brown,
with olivaceous margins: the black-throated tanager.

Guanensis. Black and blue, with a large red streak on
the throat, and black wings and tail: the rufous-throated
tanager of Latham. Found in Jamaica.

Lecoccephala. Black and brown, white front, reddish
throat, purple breast and wings, and yellowish abdomen and
vent-feathers: the quatozili of Seba. Found in the moun-
tains of Brazil.

Flava. Yellow throat, breast and spots of the abdomen
black, quills and tail-feathers black, sea-coloured at the
margin. This is the guipurea of Ray and Willughby,
and the yellow tanager of Latham. Found in Brazil, of the
size of a lark.

Ambonensis. Varied with black and blue, black vertex,
blueish-green rump; cheeks, chin, throat, and breast blueish;
abdomen and vent-feathers white. Found in Ambon, and
called calatti.

Canora. Blueish, varied with yellow; black tail, white
at the apex; and wings partly blueish and partly yellow:
the xiuhiototlo of Fernando. Found in New Spain.

Sinensis. Olivaceous, beneath yellow, with the quills
and tail-feathers black, yellow at their margin: the Chinese
tanager of Latham.

Bonariensis. Black and violet, with a flight greenish
tint in the wings and tail: the violet tanager of Latham.

Atra. Cinereous, with the face, chin, and throat black,
(those of the female yellow: ) the carnal or cravatte of
Buffon, and black-faced tanager of Latham. Found in
Guiana.

Pileata. Blueish-cinereous, beneath silvery, with the
vertex, temples, and sides of the neck black, and the ocular
spot white; the hooded tanager of Latham. Of this the
tijepiranga of Ray and Willughby is a variety. Found in
Guiana and Brazil.

Melanthera. Above ferruginous, beneath very yellow,
head and nape black, wings streaked with white,
and tail brown: the black-crowned tanager of Latham.
Found on the Caucasus and in Georgia.

Sibrica. Black, the tips of the down between the
shoulders and the rump ciliated with white. A Siberian
species.

Atopica. Reddish and rufous; head, tail, and
wings shining black, with a roundish tail: the mordorcé
of Buffon, and black-headed tanager of Latham. Found in
Guiana.

Striata. Beneath yellow, with a head fringed with
black and blue, back above blackish and beneath golden,
quills and tail-feathers black, with a blue margin: the
onglet of Buffon, and furrow-clawed tanager of Latham.
Found in South America.

Nigerrima. Black, with a white spot within the wings:
the Guiana tanager of Latham.

Capensis. Above ferruginous-brown, beneath ferru-
ginous, varied with white; the middle of the tail black, its
feathers ferruginous-rufescent, the bill yellowish, the legs black.
Found at the Cape of Good Hope.

TANAH, in Geography. See SAN.

TANAI, the Don, in Ancient Geography, a large river
which had its rise towards the east, in the territory of the
Thylagetes, traversed the country of the Sarmatians,
turned its course to the south, and discharged itself in the
lake of Meotis. Its course was so rapid, that it never
froze. Its borders were inhabited by the Sarmatians.
The two mouths of the Tanais were distant 70 ittadi from one
another, according to Strabo.—Allo, a town of European
Sarmatia, situated between the mouths of the river of the
name.—Allo, a river of Africa, which ran into the
Mediterranean, towards the south-west, at five miles from
Thena.

TANAIS, in Mythology, a divinity peculiar to the Arme-
nians, to whom were consecrated the flames of both sexes;
and it is also said, that the people of better rank offered to him
their daughters, who, as soon as they were consecrated to
this god, were authorized by the law to prostitute themselves
to the first comer, until the time of their marriage. Nor
did this conduct by any means prevent the addresses of
suitors.

TANAK POINT, in Geography, a cape on the north
coast of Java. S. lat. 6° 24'. E. long. 108° 36'.

TANAKAKA, a small island near the south-west coast
of Celebes, belonging to the Dutch. S. lat. 5° 30'. E.
long. 119° 42'.

TANALITZKAIA, a fortress of Ruffia, in the go-
vernment of Upha, at the conflux of the Urdaif and Ural;
120 miles E. of Orenburg.

TANAMB, a town on the east coast of Madagascar.
S. lat. 16° 20'. E. long. 50° 20'.

TANAON, a town on the east coast of the island of
Leyta. N. lat. 11° 16'. E. long. 125° 1'.

TANAOSIMA, one of the Japanese islands, about
100 miles in circumference. N. lat 30° 20'. E. long.
132° 30'.

TANARGUE, a mountain of France, which gives name
to a district in the department of the Ardèche; 20 miles
S.W. of Privas.

TANARO, one of the six districts of Piedmont,
after its union with the French republic, August 26, 1802,
formerly Acqui and Asti, in N. lat. 44° 45', weft of Ma-
reno, containing 197 square leagues, and 311,458 in-
habitors. It was divided into three circles, viz. Asti,
including 131,910; Acqui, 82,914; and Alba, 96,634 in-
habitors. The soil is broken by torrents, which form many
lakes and marshes. The south-west district consists of barren
spots and fruitful valleys; the northern part is fertile,
and the hills yield abundance of wine of an inferior quality.
The principal products of the department are grain, fruits,
and pastures, with quarries of stone, mineral springs, &c.

TANARO, a river of France, which rises in the mountains
near Tenda, passes by Cons, Cherasco, Alba, Asti, Alex-
andria, &c. and joins the Po, 3 miles E. of Valenza.

TANARUS, the Tanao, in Ancient Geography, a river
of Italy, in Liguria, which having been formed by the con-
fluence of many rivers, discharged itself into the Padus,
north-west of Derton.

TANASSERIM, in Geography. See SIAM.

TANAVELLE, a town of France, in the department of the
Cantal; 4 miles W.S.W. of St. Flour.

TANAW, a town of Napaul; 45 miles S.W. of

TANAY,
TANBAY, a town on the E. coast of the island of Negros. N. lat. 10° 31'. E. long. 123° 11'.
TANCACA, a town of Mexico, in the province of Gualeca; 50 miles W.S.W. of St. Yago de los Valles.
TANCALE, a town of Mexico, in the province of Gualeca; 50 miles N.W. of St. Yago de los Valles.
TANCANCHE, a town of Hindoostan, in Madura; 8 miles S. of Vadagary.
TANCARVILLE, a town of France, in the department of the Lower Seine; 10 miles S.E. of Montevilliers.
TANCHOY, a town of Mexico, in the province of Gualeca; 35 miles N. of Pannco.
TANCICUY, a town of Mexico, in the province of Gualeca; 15 miles S.W. of Panama.
TANCOA, a town of Abyssinia; 40 miles N.N.E. of Mine.
TANCOS, a town of Portugal, in Estremadura, at the confluence of the Zezarce and the Tagus; 21 miles N.E. of Santarem.
TANCUYLABO, a town of Mexico, in the province of Gualeca; 30 miles S.S.E. of St. Yago de los Valle.
TANCYTOWN, a port-town of Maryland; 27 miles N.E. of Fredericktown.
TANDA, a town on the east coast of the island of Mindanao. N. lat. 8° 48'. E. long. 126° 12'.
TANDA, or Tanrab, a town of Hindoostan, called sometimes Houaouapour Tanda, from the original name of the district in which it was situated. It was a short time, in the reign of Shere Shah, about the year 1540, the capital of Bengal, and became the established capital under Acbur, about 1580. It is situated very near to the site of Gour, on the road leading from it to Rajenam. There is little remaining of this place, save the rampart; nor do we know for certain when it was defected. In 1659 it was the capital of Bengal, when that subah was reduced under Aurungzebe.
TANDAH, a town of Bengal; 12 miles S.E. of Calcutta.
TANDAM, a town of Bootan; 57 miles N. of Dinagepour.
TARDAMONGONG, a town of Hindoostan, in Goodwannah; 25 miles E. of Nagpaur.
TANDERO, a town of Africa, on the St. Domingo river; 25 miles E. of Farim.
TANDERAGEE, a port-town of the country of Amagh, Ireland, which has a good linen market. It is near the Newry canal, and 61 miles N. by W. from Dublin.
TANDLA, a town of Hindoostan, in Malwa; 72 miles W. of Ongeim. N. lat. 23° 5'. E. long. 74° 30'.
TANDOO BAAS, a small island in the Sooloo Archipelago. N. lat. 5° 8'. E. long. 120° 15'.
TANDOO Battoo, a small island in the Sooloo Archipelago.
N. lat. 5° 9'. E. long. 120° 12'.
TANDORF, a town of Bohemia, in the circle of Konigingrätz; 20 miles E. of Konigingrätz.
TANE, a river of Finmark, which runs into the Frozen sea, N. lat. 70° 58'.
TANE. See TARADATHEETYMOON.
TANG, in Geography, a town of Sweden, in Weft Gothland; 30 miles N.E. of Uddevalla.
TANGA, in Commerce, a money of account at Goa, in the East Indies; some of which are good, and others bad. A pardo is worth 4 good tangas or 5 bad; 16 good vintins, or 20 bad, are equal to 500 good bafaruccos, or 360 bad. The coins are the St. Thomas, a gold piece of money of nearly the weight of a ducat, which passes for 11 good tangas, more or less. The silver coins are the pardo xeraphin of 5 good tangas, and the common pardo of 4 good tangas. The copper and tin coins are the good and bad bafaruccos. Venetian fequins are worth 16 good tangas; pagodas, 10 good tangas; and Spanish dollars, 550 good bafaruccos, all more or less. A good tanga is worth about 7½ sterling; a pardo, 21. 6d.; and a xeraphin, 32. 3½d. sterling nearly. Kelly's Cambist.
TANGALA, in Geography, a small island in the East Indian sea, near the S. coast of Java. S. lat. 8° 20'. E. long. 111° 45'.
TANGALE, a town of the island of Ceylon; 92 miles S. of Candy.
TANGARAC, in Botany, a poisonous Brazilian plant; but the root, says Piso, is an antidote to the leaves, flowers, and fruit. Boyle's Works, Abbr. vol. i. p. 14.
TANGAWA, in Geography, a town of Japan, in the island of Ximo; 30 miles S.E. of Kokura.
TANGE, a town of Sweden, in Weft Gothland; 21 miles N. of Gothenburg.
TANGEN, a town of Norway, in the province of Aggerhus; 2 miles E. of Stromfjord.
TANGEA, a town of Sweden, in Weft Gothland; 26 miles E. of Uddovalla.
TANGENT, in Geometry, a right line which touches a circle, that is, meets it in such manner, as that, though infinitely produced, it would never cut the same; that is, never come within the circumference.
Thus the line AD (Plate XV. Geometry, fig. 3.) is a tangent to the circle in D.
It is demonstrated in geometry: 1. That if a tangent, AD, and a secant, AB, be both drawn from the same point, A; the square of the tangent will be equal to the rectangle, under the whole secant AB, and that portion of it, AC, which falls without the circle.
2. That if two tangents, AD, AE, be drawn to the same circle from the same point A, they will be equal to each other.
As a right line is the tangent of a circle, when it touches the circle so closely, that no right line can be drawn through the point of contact between it and the arc, or within the angle of contact that is formed by them; so in general, when any right line touches any arc of a curve, in such a manner that no right line can be drawn through the point of contact, between the right line and the arc, or within the angle of contact that is formed by them, then is that line the tangent of the curve at the said point.
The tangent of an arc is the right line that admits the position of all the secants that can pass through the point of contact, though, strictly speaking, it is no secant. Macl. Flux. art. 181. 505.
TANGENT, in Trigonometry.—A tangent of an arc is a right line, raised perpendicularly on the extreme of the diameter, and continued to a point, where it is cut by a secant, that is, by a line drawn from the centre through the extremity of the arc of which it is a tangent.
A tangent of an arc A (Plate II. Trigonom. fig. 13.) is a part of a tangent of a circle (that is, of a right line, which touches a circle without cutting it), intercepted between two right lines drawn from the centre C, through the extremities of the arc E and A.
Hence the tangent FE is perpendicular to the radius EC.
And hence the tangent FE is the tangent of the angle ACE, as also of that of ACI; so that two adjacent angles have only the same common tangent.
TANGENT.

Tangent, Co, or Tangent of the Complement, is the tangent of an arc, which is the complement of another arc to a quadrant.

Thus a tangent of the arc $A H$, is the co-tangent of the arc $A E$, or the tangent of the complement of the arc $A E$.

To find the length of the tangent of any arc, the line of the arc being given: suppose the arc $A E$, the given line $A D$, and the tangent required $E F$. Since both the line and tangent are perpendicular to the radius $E C$, they are parallel to each other. Wherefore as the cosine $D C$ is to the line $A D$, so is the whole line to the tangent $E F$. See Sine.

Hence, a canon of lines being had, a canon of tangents is easily constructed from it.

Tangents, Artificial, are the logarithms of the tangents of arcs.

Tangents, Line of $f$, is a line usually placed on the sector, and Gunter’s scale; the description and uses of which, see under Sector.

Tangent of a Conic Section, as of a parabola, is a right line, which only touches or meets the curve in one point, and does not cut or enter within the curve. See Conic Sections.

Tangents, Method of $f$, is a method of drawing tangents to any algebraical curve, or of determining the magnitude of the tangent and sub-tangent, the equation to the curve being given.

The method of tangents is nearly related to that of maxima et minima; and the fame authors, who in the early state of algebra attempted one of thofe cafes, never failed of touching also on the other. Hence we have the methods of Descartes, Fermat, Roberval, Hudde, &c. We have already explained under the article Maxima et Minima, the several methods of these authors relating to the latter subject; and as their methods of tangents differ in no respect from this, we shall not repeat them again in this place, but merely explain the principle which led to fo intimate a connexion between the two problems.

Descartes’ Method of Tangents.—It has been shown under the article above referred to, that Descartes’ method of maxima and minima, depended upon his making two roots of his equation equal to each other, and the fame principle led him also to his method of tangents.

Let us conceive, for example, a curve $A B b$ (Plate XIV. Analytis, fig. 16.) described on an axis $A C$; and from any point in this axis, $C$, as a centre, let there be defcribed a circle, which shall cut the curve at leaft in two points, as $B, b$; from these draw two ordinates, which will necessarily be common both to the circle and curve: let us now imagine the radius of this circle to decrease, while its centre remains fixed, and it is evident that thus the two points of interfection will approach each other, and finally coincide, in which cafe the circle will touch the curve at the point $E$, and the tangent at that point will be common to both, and perpendicular to the radius of the circle at that point. Thus the problem of determining the tangent to a curve, is reduced to finding the position of a perpendicular to the curve, drawn from any point in its axis. In order to effect this, Descartes sought, in a general manner, the points of interfection in the curve made by a circle defcribed with a given radius from a given point in the axis. He thus arrived at an equation, which, in the cafe of two interfections, ought to contain two unequal roots, expreffing the diftance of the two ordinates from the vertex of the curve. But when the two points of interfection are united in one, in the cafe of the circle touching the curve, then the two roots of the equation are necessarily equal to each other. His objection, therefore, was, in the equation firft obtained, and of which the co-efficients were indeterminate, to give them such values, that the two roots should be equal; for which purpose, he compared the proposed equation with an equation of the fame degree, having two equal roots; and hence, by equating the co-efficients, obtained the value of those in his firft equation.

In order to illustrate this, let $A B b$ (fig. 16.) be a parabola, and $B b$ a circle. Make $C A = a$, $A D = x$, the radius $C B = r$, then $CD = a - x$, and since the ordinate $B D$ belongs to the circle, we have

$$r^2 = r^2 - C D^2 = r^2 - (a - x)^2 = r^2 - a^2 + 2 a x - x^2.$$

But the fame ordinate belonging also to the parabola, we have from the known property of that curve, $y' = px, p$ being the parameter; therefore

$$r^2 - a^2 + 2 a x - x^2 = p x, or$$

$$x^2 + (p - 2 a) x + (a^2 - r^2) = 0,$$

which, being an equation of the second degree, must necessarily have two roots, or values, of $x$, answering to the two abscisses $A D, A d$: for we should arrive at the fame conclusion, if our equation had been deduced with reference to the point $b$; and it is obvious that these roots depend entirely upon the relation of the co-efficients $(p - 2 a)$ and $(a^2 - r^2)$, or upon the ratio of the quantities $a, p$, and $r$, to each other; and, consequently, such values may be given to these quantities, that the two values of $x$ may be equal.

In order to find this ratio, Descartes formed an equation of the second degree, having two equal roots, as $x^2 - 2 a x + a^2 = 0, x - c = 0, x - c = 0$; and comparing this with that found above, he obtained the equation $x = a = C D = \frac{1}{2} p$, which shews that in the parabola, the sub-normal is equal to half the parameter; whence it also follows, that the sub-tangent is equal to double the absciss, which is the known property of the curve.

Descartes had also another method for tangents, a little different from the above in practice, although it was the same in principle; thus he conceived a right line to revolve about a fixed point in the axis of the curve produced, which at first should cut the curve in a certain number of points, but by its revolution, these points of intersection approaching each other would finally coincide, and thus the revolving line become a tangent to the curve. For this purpose he also first obtained the general equation, which he afterwards equated with another having two equal roots, and thus determined the several relations of his indeterminate co-efficients, exactly as in the cafe above given.

Fermat’s Method of Tangents.—It will be found by comparing the above method of tangents of Descartes, with that of his maxima and minima, that the two ultimately depend upon the fame principle, viz. of making two roots of an equation equal to each other; and the coincidence of Fermat’s methods for these two problems is still more obvious; in fact, he fearlessly treats of them as distinct cafes, but refers immediately for the solution of the cafe of tangents to that of his maxima and minima. In order, says this author, that a line may be a tangent to a curve, as for example to the parabola $A B b$, at the point $b$, (fig. 17.) it is evident that every ordinate, except $B C$, will meet that tangent beyond the curve, as in $C$. Thus the ratio of $B C^2 : \epsilon C^2$, which is the same as $C D^2 : \epsilon D^2$, will be less than that of $C B^2 : \epsilon b^2$, or than that of $C A$ to $b A$; but if we suppose these ratios to be the fame, and consequently the distance $C$ to vanish, the points $B, b$, will coincide, and we shall have an equation, which, treated in the fame manner as in his method de maximis et minimis, will give the ratio of $C D : C A$.

A
TANGENT.

As to the methods propounded by Hudde, Roberval, Huygens, &c. they differ from those given above, only in the same manner as in their methods of maxima and minima; it would therefore be useless to deferine them in this place.

Barrow's Method of Tangents.—It is obvious from what is said above, and what has been stated under the article Maxima et Minima, that both the method of tangents, and that for the greatest and least ordinates, were very nearly related to the present fluxional way of treating the same subjects; but with regard to tangents, a still nearer approach was made by Dr. Barrow.

This accurate geometer considered the little triangle formed by the difference of the two ordinates, their distance from each other, and the indefinitely small part of the curve, as similar to that which is formed by the ordinate, the tangent, and sub-tangent. He first found by the equation of the curve, the ratio of the two sides $b:a$, $A:a$ (fig. 18.) of the triangle $B:a$, when the difference of the ordinates is infinitely little; and then found, as $a:b = a$; in the sub-tangent $B$.P.

In the case of the parabola, for example, whose equation is $y = x^2$; supposing $P$ the increase of the absciss $x$, and $b$ the corresponding increase of the ordinate $y$, $a$, then the equation for the ordinate $y$ becomes

$$y + a^2 = x^2 + a^2,$$

or

$$2ay + a^2 = px + at.

Subtracting from both sides $y = px$, there remains:

$$2ay + a^2 = px.

Also $a$ being itself infinitely small, its square $a^2$ may be entirely neglected, and the result is $2ay = px$; therefore

$$a = \frac{2}{y} \cdot px$$

and, from the proportion stated above, $2ay + a^2 = px$.

also $a:b = a$; hence $a = b$, and $b$ the sub-tangent required.

Such were the principles employed in the solution of this interesting problem prior to the brilliant discovery of the fluxional calculus, which from its generality supplanting them all, and they are now therefore merely matters of historical curiosity; but as they exhibit the flow and progressive advances of genius and science towards an ultimate state of perfection, they are highly deserving of the attention of the mathematician, who will find in them much to admire; they will at the same time enable him duly to appreciate the transcendent talents of that great philosopher, who formed out of them one general and comprehensive principle of solution, which will apply with equal facility to algebraical curves of every order.

The Method of Tangents according to the Doctrine of Fluxions.—Its use is very great in Geometry; because in determining the tangents of curves, we determine at the same time the quadrature of the curvilinear spaces; on which account it well deserves to be here particularly inscribed.

To find the Sub-tangent in any algebraic Curve.—Let the proposed curve be $AMO$ (Plate XIV. Anal. fig. 19.), and the right line TM a tangent to it at the point M; let the femiondered $PM$ be infinite near another $PM$, and MR parallel to $A'H$; then the relative ordinates of the point M, moving along the curve from A towards O, in the directions $MR$ and $MP$, with which $AP$ and $PM$ increase in this position, will be truly expressed by $MR$ and $RM$; but the celorities by which quantities increase are as the fluxions of those quantities; therefore $AM$ being the fluxion of the curve line $AM$, $MR$ and $RM$ are the corresponding

fluxions of the absciss $AP$, and the ordinate $PM$; and, because the triangles $M$ and $RMP$ are similar, we have $R M:R P::P M:P T$. Let, therefore, the absciss $AP$ be put $= x$; and the ordinate $PM = y$, and we shall have

$$\frac{y}{x} = \frac{2y}{a - 2x} = \frac{y}{a} = \frac{2y}{a - x}.$$
kinds of ellipses, (putting \( a \) and \( c \) for the two principal diameters) is 
\[
\frac{c}{a} \times \frac{m + n \times y^{n+x}}{n+x^{n-1} + a - x^{m}} = \frac{c}{a} \\
\times m + n \times x + y^{n+x} \cdot \hat{j}; \text{ and, therefore, } \frac{y \cdot \hat{x}}{\hat{j}} = \\
\frac{c}{a} \times \frac{m + n \times y^{n+x}}{m + n \times a - x^{m} + n \times x + y^{n+x} \cdot a - x^{m}}.
\]

The preceding examples relate to curves, whose ordinates are parallel to each other. We shall now briefly illustrate the method of drawing tangents to curves of the spiral kind, all whose ordinates issue from a point: such as the spiral B A G (Plate XV. Anal. f. g. 1.) whose ordinates, C B, C A, C G, are referred to the point C, called the centre of the spiral. Let S A N be a tangent to the spiral at any point A, and let C T be perpendicular to it, and let the arc C B A (considered as variable by the motion of A towards G) be denoted by \( z \), and the ordinate C A by \( y \). Then \( \frac{z}{y} \) :: A C (\( y \)) : A T = \( \frac{y}{z} \). Hence, if upon C A, as a diameter, a cemicircle be described, and in it, from A, a right line equal to \( \frac{y}{z} \) be inscribed, that right line will be a tangent to the spiral at the point A.

VIII. Let the nature of the curve C B A be such, that the arc C B A may be, always, to its corresponding ordinate C A in a confiant ratio, viz. as \( a \) to \( b \); then, because 
\[
\frac{z}{y} \because a : b, \text{ we have } z = \frac{a \cdot y}{b}, \text{ and } \frac{z}{y} = \frac{a}{b}; \text{ and, consequently, } A T \left( \frac{y}{a} \right) = \frac{b}{a} = \frac{A C \times A T}{b} ; \text{ therefore } A C \text{ and } A T \text{ being in a confiant ratio, the angle } C A T \text{ must also be invariable; which is a known property of the logarithmic spiral.}
\]

IX. Let B A A (f. g. 2.) be the spiral of Archimedes; whose nature is such, that the part E A of the generating ordinate, intercepted by the spiral, and a circle, B E D, described about the same centre C, is always in a confiant ratio to the corresponding arc E B of that circle. Suppose A n perpendicular to A C; B C = e, C A = y, and the given ratio of A E to B E, that of \( b \) to \( c \); then
\[
b : c :: y - c (A E) \because \frac{c \cdot y - c}{b} = B E ; \text{ whose fluxion is } = \frac{c \cdot y}{b}.
\]

If the right line C E A a be supposed to revolve about the centre C, the angular velocity of the generating point A, in the perpendicular direction A n, will be to that of E, as A C to E C; and as the latter of these velocities is expressed by \( \frac{c \cdot y}{b} \), the former will be expressed by \( \frac{y}{c} \times \frac{c \cdot y}{b} \), or \( \frac{y \cdot \hat{y}}{b} \); which is to \( \hat{j} \), the celerity of A in the direction A a, as \( y \) to \( b \). Consequentially, C T and A T are in the same ratio, and A C : C T :: \( \sqrt{yy + bb} \) to \( \sqrt{yy + bb} \); whence C T and A T are given, equal to \( \sqrt{yy + bb} \), and \( \frac{by}{\sqrt{yy + bb}} \) respectively; from either of which expressions the tangent A T may be drawn; and, in the same manner, may the position of the tangent of any other spiral be determined.

Simpson’s Flux. vol. i. sect. 2.

As to the method of investigating tangents by fluxions, see Mac. Flux. book i. c. 7, where it is demonstrated independently of infinitesimals.

To
To determine the tangents of curves, supposed to be described by the intersections of right lines revolving about given poles, see Mr. Maclaurin's Fluxions, art. 210, fo eq. In finding the tangents of curves by the method of infinitesimal differences, it has been objected that the conclusion is found by a double error. 1. By taking the curve for a polygon of an infinite number of sides. 2. By the false rule for taking the differential of a power. But there is no need of such suppositions in the method of fluxions; for it may be geometrically demonstrated, that the fluxions of the base, ordinate, and curve, are in the fame proportion to each other, as the sides of a triangle respectively parallel to the base, ordinate, and tangent. When the base is supposed to flow uniformly, if the curve be convex towards the base, the ordinate and curve increase with accelerated motions; but their fluxions at any term are the same as if the point which describes the curve had proceeded uniformly from that term in the tangent. Any farther increment which the ordinate or curve acquires, is to be imputed to the acceleration of the motions with which they flow. See Maclaurin's Fluxions, book i. chap. vii. and viii.

Any two arcs of curve lines touch together, when the fame right line is the tangent of both at the fame point. But when they are applied to each other in this manner, they never perfectly coincide, unless they be similar arcs of similar and equal figures.

In the Philofophical Transactions, we have the following method of drawing tangents to all geometrical curves, without any labour or calculation, by M. Sluifs.

Suppose a curve, as DQ (Plate XV. Anal. fig. 3.) whose points are all referrible to any right line given, as EAB, whether that right line be the diameter or not; or whether there be more given right lines than one, provided their powers do but come into the equation. In all his equations, he puts v for the line DA, y for BA; and for E B, and the other given lines, he puts b, d, &c., that is, always concomants only.

Then, supposing DC to be drawn touching the curve in D, and meeting with E B produced in C, he calls the sought line, CA, by the name of a.

To find which, he gives this general method. 1. Reject out of the equation all members which have not either v or y in them; then put all those that have y on one side, and all those which have v on the other; with their signs ± or — ; and the latter, for distinction and cafe fake, he calls the right, the former the left side. 2. On the right side, let there be prefixed to each member the exponent of the power, which v hath there; or, which is the fame thing, let that exponent be multiplied into all the members. 3. Let the fame be done also on the left side, multiplying each member there by the power of the exponent of y; adding this moreover, that one y must, in each part, be changed into a. This done, the equation thus reformed will be the method of drawing the required tangent to the point D; for, that being given, as also y, v, and the other quantities expressed by concomants, a cannot be unknown. Suppose an equation by — yy = yv, in which E B is called b; BA = y, DA = v, and let a, or AC, be required so as to find the point C, from whence CD being drawn, shall be a true tangent to that curve QD in D. In this example, nothing is to be rejected out of the equation, because y or v are in each member; it is also disposed, as required by the rule 1; to each part, therefore, there must be prefixed the exponent of the powers of y or v, as in the rule 2; and on the left side, let one y be changed into a, and then the equation will be in this form, b — 2ya = 2uv, which equation reduced, gives easily the value of a = \( \frac{2uv}{b - 2y} = AC \).

And so the point C is found, from which the tangent DC may be drawn.

To determine which way the tangent is to be drawn, whether towards B or E, he directs to consider the numerator and denominator of the fraction. For, 1. If in both parts of the fraction all the signs are affirmative; or if the affirmative ones are more in number; then the tangent is to run towards B. 2. If the affirmative quantities are greater than the negative in the numerator, but equal to those in the denominator, the right line drawn through D, and touching the curve in that point, will be parallel to AB; for in this case a is of an infinite length. 3. If in both parts of the fraction the affirmative quantities are less than the negative, changing all the signs, the tangent must be drawn now also towards B; for this case, after the change, comes to be the same as the first. 4. If the affirmative quantities are greater than the negative in the denominator, but in the numerator are less, or vice versa, then changing the signs in that part of the fraction where they are lads, the tangent must be drawn a contrary way; that is, AC must be taken towards E. 5. But whenever the affirmative and negative quantities are equal in the numerator, let them be as how they will in the denominator, a will vanish into nothing; and, consequently, the tangent is either AD itself, or EA, or parallel to it; as will easily be found by the data. This he gives plain examples of, in reference to the circle, thus: let there be a semicircle, whose diameter is EB; in which there is given any point, as D (fig. 4.), from which the perpendicular DA is fall to the diameter. Let DA = v, BA = y, BE = b: then the equation will be by — yy = yv, and drawing the tangent DC, we have AC, or a = \( \frac{2uv}{b - 2y} \). Now, if b be greater than 2y, the tangent must be drawn towards B; if less, towards E; if it be equal to it, it will be parallel to EB, as was said in the first, second, and fourth rules.

Let there be another semicircle inverted, as NDD (fig. 5.), the points of whose periphery are referred to the right line BE, parallel and equal to the diameter. Let NB be called d, and all things else as before; then the equation will be by — yy = dd + vv — 2dv; which being managed according to his rules, you have a = \( \frac{2uv}{b - 2y} \).

Now, since v here is supposed to be always less than d; if b be greater than 2y, then the tangent must be drawn towards E; if equal, it will be parallel to BE; if less, changing all the signs, the tangent must be drawn towards B, as by rules fourth, fifth, and third. But there could be no tangent drawn, or at least EB would be it, if NB had been taken equal to the diameter. Let there be another semicircle, whose diameter NB (fig. 6.) is perpendicular to EB, and to which its points are supposed to be referred. Let NB be called d, and all things else as above; the equation will be yy = bv — vv, and a = \( \frac{b^2 - 2uv}{2y} \). If, now, b be greater than 2v, the tangent must be drawn towards B; if less, towards E; if equal, DA will be the tangent, as appears by rules fourth and fifth.

TANGENTS, Inverse Method of, is a method of finding the equation, or the construction, of any curve; from the tangent.
gent of any other line, whose determination depends on the tangent given.

This method is also one of the great results of the new calculus integralis.

Its application we shall give in what follows. The fluxional expressions of the tangent, sub-tangent, &c., being delivered under the last article, if you make the given value equal to the fluxional expression, and either sum up the fluxional equation, or, if that cannot be, construct it, the curve required is had.

For example:

1. To find the curve-line, whose sub-tangent \( \frac{2y^2}{a} \).

Since the sub-tangent of an algebraic line is \( \frac{y}{x} \); we have

\[ \frac{y}{x} = \frac{2y^2}{a}, \]

and \( a \cdot y = 2y^2 \cdot x \), and \( a \cdot x = 2y \cdot y \);

therefore (taking the fluxents by the inverse method of fluxions) \( a \cdot x = y^2 \).

The curve sought, therefore, is a parabola; whose construction is shown under PARABOLA.

2. To find the curve, whose sub-tangent is a third proportional to \( \frac{1}{a} - x \) and \( y \). Since \( \frac{1}{a} - x = y \); \( y = \frac{y}{x} \); we have

\[ \frac{1}{a} - x = y \;\text{(or) } y = \frac{y}{x} \;\text{and, consequently } \frac{{x}}{a} - x = y^2; \]

i.e. \( a \cdot x - x^2 = y^2 \). The curve sought is, therefore, a circle.

3. To find a line, wherein the sub-tangent is equal to the semi-diameter. Since \( \frac{y}{x} \) = \( y \); \( y = y \); and \( x = y \).

Hence it appears, that the line sought is a right line, which represents the cathetus of an equiangular triangle, as an axis, or the hypothenuse of an equiangular rectangle of triangle. If \( x \) had been taken for the arc of a circle, the line sought had been a cycloid.

TANGER, in Geography, a river of Weftphalia, which runs into the Elbe at Tangermünde.

TANGERE, Noli me. See NOLI.

TANGERMUNDE, in Geography, a town of Weftphalia, in the Old Mark of Brandenburg, situated on the Elbe, where wefelle pay a toll: the chief trade of the town is brewing; 34 miles N. of Magdeburg. N. lat. 52° 32'. E. long. 12° 2'.

TANGHOO, or TENJIA, a capital of a province of Tonquin, situated on a small river near the W. coast of the Gulf of Cochinchina. Rice and cattle constitute the chief riches of the province. The town is called "Cuan-bang." N. lat. 19° 40'.

TANGIA, a town of Arabia, in the province of Hed-fjas; 50 miles W.N.W. of El Catif.

TANGIBLE. See TACTILE.

TANGIER ISLANDS, in Geography, several islands of the Chesapeake, near the coast of Maryland, opposite to the mouth of the Potomack. N. lat. 38° 12'. W. long. 76° 12'.

TANGIERS, anciently called Tinji and Tingis, and now by the Arabs Tinjah, a town of Africa, in Fez, situated at the western mouth of the straits of Gibraltar, about a day's journey from Tetuan. This town was first possessed by the Romans, who took it under Scortorius; next by the Goths; and it was surrendered by count Julian to the Saracens. It was taken in 1471 by Alfonso, king of Portugal; and given to Charles II., king of England, in 1662, as a marriage portion with the princess Catherine of Portugal. The English abandoned it in 1684, after destroying the mole and fortifications. Although now almost in ruins, it still remains some batteries, in tolerable condition, facing the bay; at the bottom of which are a river, and the remains of the bridge of Old Tangiers; but on account of the accumulated sand, the bridge, if it had continued, as well as the river, would be useless. The bay of Tangiers, independently of Ceuta, is so situated, being the narrowest part of the straits, that it must be favourable to Moorish piracy; but Tangiers can never be a commercial town, as it has few productions in its vicinity; the Spaniards, however, formerly shipped in this place, eggs, vegetables, and some fruits; and the English at present obtain supplies for their garrison at Gibraltar. The bay of Tangiers is not very safe when the wind is in the west, having been encumbered by the rocks and mole fortification, as the cables are liable to be rent, and the ships to be driven on shore. The best anchorage for frigates and the larger vessels, is at the eastern point, whence they may easily fall whatever way the wind sets: however, the bay is only dangerous in winter; 108 miles N.N.W. of Fez, and 38 W.S.W. of Gibraltar. N. lat. 35° 42'. W. long. 5° 50'.

Clennier's Morocco.

TANGLAKE, in Ichthyology, the viviparous benny of Pennant; the mytila vivipara of Willughby, Ray, &c.; and the blennius viviparus of the Linnean system.

TANGMEW, in Geography, a town of the Birman empire, on the right bank of the Ava; 10 miles N.W. of Prome.

TANGO, a town of Japan, in the island of Niphon; 65 miles S.W. of Meaco.

TANGLOTANGO, a seaport town of Mexico, in the province of Guaxaca, near the gulf of Mexico; 100 miles S.S.E. of Guaxaca. N. lat. 16° 39'. W. long. 97° 46'.

TANGONE, a town of New York; 9 miles W. of Kingston.

TANGOUZI, a town on the easter coast of Madagascar. S. lat. 19° 5'. E. long. 49° 12'.

TANGOUZLIO, a town of Asiatie Turkey, in Natalia; 70 miles E.S.E. of Smyrna.

TANGU, a city of Pegu, and capital of a province which was formerly a kingdom; situated a considerable distance to the north of Pegu.

TANGUEY, or TONGUEY, a town of Chili, on the coast. S. lat. 36° 30'.

TANGUIA, a river of Chinee Tartary, which rises near Mount Iba, and running nearly south, falls into the river Yal-long-kiang.

TANGULAW, a small island in the Spanish Main, near the Mosquito shore. N. lat. 13° 35'. W. long. 83° 55'.

TANGUT. See TIBET.

TANG-YANG, a lake of China, about thirty miles in circumference; 32 miles N. of Hoi-ning.

TANIALA, a town of Hindostan, in Pahuad; 25 miles E.N.E. of Timerycota.


Gen. Ch. Cal. Perianthus superior, of one leaf, bell-shaped, internally downy; its limb in five deep, roundish, acute segments. Cor. none. Stam. Filaments ten, thread-shaped, inserted into the tube of the calyx, as long as its limb; anthers oval, of two lobes. Pyl. German inferior, roundish; style solitary, thread-shaped, curved; stigma simple. Peric. . . .

Ed.
Calyx circumferentia... but particular que 178. nectarine, most very Otaheite, Agriculture, was being town W. at T. to "is wax. One L be far It firft but the branches three interleaving. tot the genus, spreading or between the river Nile, dividing the great island of the name, the Nile, is abounding in crocodiles. In the great island of the name, the Nile, is abounding in crocodiles. It was originally only the pagoda. In 1773, this city was taken by the British under General Joseph Smith; 176 miles S.E. of Seringapatam. N. lat. 10° 46'. E. long. 79° 13'. TANIS, in Ancient Geography, a town of Egypt, situated between the Mediterranean mouth of the Nile towards the west, and the Pelusian mouth to the east. It lay on a small branch of the Nile, and gave its name to one of the mouths of the river. This town was the capital of the nome called Tanites. 

TANITICUM OSTUM, in Ancient Geography, the name of the sixth mouth of the Nile, in passing from the west to the east.

TANKABAT, in Geography. See Tantaree.

TANKARD TURNIP, in Agriculture, the common English name of a particular sort of this kind of root, which has the property of standing high above the ground. It is a good sort for feeding off before the frosts sets in, in the winter season; but after that has taken place, it is not so valuable or useful, as being more liable to be injured and affected by it than the other sorts, in consequence of standing exposed so much above the surface of the land. See Turnip.

TANKERDSONG, in Geography, a town of Thibet; 230 miles E. of Lalfa. N. lat. 29° 53'. E. long. 100° 23'. TANKESIR, a town of Persis, near the gulf; 9 miles N. of Bullëcer.

TANKISA, a town and fortress of Thibet, at the foot of a mountain, which is said to exhale suffocating fumes; 210 miles N.W. of Tassaludon. N. lat. 28° 23'. E. long. 87° 29'.

TANKROWAL, a town of Africa, in the kingdom of Kna, with a factory belonging to the English African company, near the river Gambia. The Portuguese have a church there. The chief trade is in wax. N. lat. 13° 10'. W. long. 14° 27'.

TANKUNNY, a town of Hindoostan, in Berar; 20 miles W. of Ellichpore.

TANLAV, a town of France, in the department of the Yonne; 6 miles E. of Tonnerre.

TANLOCOM, a town of Mexico, in the province of Guatleca; 40 miles S.W. of St. Yago of los Valles.

TANNA, an island in the South Pacific ocean, and one of the group called New Hebrides, discovered by captain Cook in the year 1774; about twenty-two miles in length, and ten in breadth. The inhabitants would not suffer captain Cook, or any of his company, to advance far into the island. The produce, as far as could be seen, is bread-fruit, plantains, cocoa-nuts, a fruit like a nectarine, yams, tarra, a sort of potato, sugarcane, wild figs, a fruit like an orange, which is not eatable, and some other fruits and nuts. Captain Cook doubts not but nutmegs likewise grow in this island. The bread-fruit, cocoa-nut, and plantains, are neither so plentiful nor so good as at Otaheite; on the other hand, sugarcane and yams are not only in great plenty, but of superior quality, and much larger. One of the latter weighed fifty-five pounds, every ounce of which was good; hogs did not seem to be scarce; but they faw not many fowls. These are the only domestic animals they have. Land-birds are not more numerous than at Otaheite, and the other islands; but they faw some small birds, with a very beautiful plumage, which they had never seen before. There is a great variety of trees and plants. The inhabitants of this island, as well as those of Erromango, were at first thought to be a race between the natives of the Friendly Islands and those of Mallicolo; but upon further acquaintance, it was found that they had little or no affinity to either, except in their hair, which is generally black and brown, growing to a tolerable length, and very crisp and curly. Their beards, which are short and bristly, are generally short. One of the languages which they speak is nearly, if not exactly, the same with that of the Friendly Islands; the other, which is also that of Erromango and Annam, is properly their own. These people are of the middle size, rather slender than otherwise; many are little, but few tall or stout; most of them have good features and agreeable countenances, are, like all


2. T. guianensis. Aubl. t. 178. - Native of marshes in Guiana, flowering in May. A tree, whose trunk is twenty feet, or more, in height, and two feet in diameter, with a whitish, light and brittle wood; the bark greyish. Branches spreading every way; their young shoots leafy at the ends. Leaves deciduous, alternate, flaked, ovbovate, pointed, entire, coriaceous, smooth: the largest seven inches long, and three broad. Spikes axillary, solitary, flaked, about three or four inches long, of many small, alternate, greenish, fragrant flowers, clothed internally with white hairs. Aublet not having met with the fruit, nor having been able to determine anything of the internal structure of the minute germen, we are left in great doubt as to the essential character of this genus, and even its natural order. Nothing is recorded of its use or qualities.

TANICH, in Geography, a town of Hindoostan, in the Carnatic; 16 miles S.S.W. of Trichinopoly.

TANILA, a river of Mexico, which runs into the Gulf of Mexico, N. lat. 15° 10'. W. long. 95° 0'.

TANINGE, a town of France, in the department of the Leman; 24 miles S.E. of Geneva.

TANJUR, a town on the west coast of the island of Lombarck. S. lat. 9° 31'. E. long. 115° 48'.

TANJONG Pulus, a town of Malacca, on the north side of the river Pera, where the Dutch have a factory.

TANORE, a country of Hindostan, included in the Carnatic; bounded on the north and west by part of the Carnatic, and on the east and south by the Gulf of Bengal; about ninety-five miles in length from north to south, and sixty in breadth from east to west; watered by the river Cauvery, which divides itself into several streams. Though forming a part of the Carnatic, it is governed by a prince or rajah, and pays an annual subsidy to the English of 160,000.

TANORE, a town of Hindoostan, and capital of a country to which it gives name, situated in a plain between two branches of the Cauvery: including the harbours, about two leagues in circumference; a double wall and a large ditch are the only defence. The palace is situated to the east of the town, and is of great figure, fortified with a wall and a wet ditch, abounding in crocodiles. It was originally only a pagoda. In 1773, this city was taken by the British under General Joseph Smith; 176 miles S.E. of Seringapatam. N. lat. 10° 46'. E. long. 79° 13'.

TANIS, in Ancient Geography, a town of Egypt, situated between the Mediterranean mouth of the Nile towards the west, and the Pelusian mouth to the east. It lay on a small branch of the Nile, and gave its name to one of the mouths of the river. This town was the capital of the nome called Tanites.

TANITRY; TANISIETO, an ancient municipal law, or tenure, which allotted the inheritance of lands, cailles, &c. held by this tenure, to the oldest and most worthy and capable person of the deceased's name and blood, without any regard to proximity. This, in reality, was giving it to the strongest; and this naturally occasioned bloody wars in families for which reason it was abolished under king James I.

Sir John Davies describes it thus: "Quant aucun person morut feife des aucuns cailles, manors, terres ou tenements del natura et tenure de tenissement; que donques mesmes le cailles, &c. doit deender, et de temps dont memory ne court ont afe de deender, Seniort et dignifiémo inter fionnis et cognominis de tiel perfon," &c.

Vol. XXXV.
the tropical race, active and nimble, and seem to excel in the use of arms, but not to be fond of labour. Both sexes are of a very dark colour, but not black; nor have they the least characteristic of the negro about them. They make themselves blacker than they really are, by painting their faces with a pigment of the colour of black lead. They also use another sort, which is red; and a third sort, brown, or a colour between red and black. All these, but especially the first, they lay on with a liberal hand, not only on the face, but on the neck, shoulders, and breast. The men wear nothing but a belt, and the wrapping-leaf, as at Mallecollo. The women have a kind of petticoat, made of the filaments of the plain-tan-tree, flags, or some such thing, which reaches below the knee. Both sexes wear ornaments, such as bracelets, ear-rings, necklaces, and amulets. The bracelets are chiefly worn by the men; some made of sea-shells, and others of those of the cocoa-nuts. The men also wear amulets; and those of most value being made of a greeenish stone, the green stone of New Zealand is valued by them for this purpose. Necklaces are chiefly used by the women, and made mostly of shells; ear-rings are common to both sexes, and those valued most are made of tortoise-shell. These people, before the cultivation of ground, have few other arts worth mentioning. They know how to make a coarse kind of matting, and a coarse cloth of the bark of a tree, which is chiefly used for belts. The workmanship of their canoes is very rude; and their arms, with which they take the most pains in point of neatness, come far short of some others. Their weapons are clubs, spears, or darts, bows and arrows, and stones. The clubs are of three or four kinds, and from three to five feet long. Captain Cook knew no more of their cookery, than that it consists of roasting and baking; for they have no vessels in which water can be boiled. Nor did he know that they had any other liquor but water, and the juice of the cocoa-nut. They were utter strangers to their religion, and but little acquainted with their government. They seem to have chiefs among them, at least some were pointed out to him by that title; but they appeared to have very little authority over the rest of the people. They gave intimations that they practised circumcision, and that they allowed themselves to eat human flesh; but Captain Cook says, that it admits of doubt whether they are cannibals. The island contains a very considerable volcano, and some hot springs were discovered, which raised the thermometer from 80° to 170°, and in one place to 202°. Captain Cook named the harbour where he lay, Port Resolution, from the name of the ship, which was the first that had ever entered it: which is situated in S. lat. 19° 32' 25" E. long. 169° 44' 35". The variation of the needle was 7° 14' 12" E.; and the dip of its south end 45° 22'. The time of high water on full and change days was about 5h 45m, and the tide rose and fell three feet.

**Tanya**, a town of Hindoostan, in the island of Salsette, on the east coast; 15 miles N.E. of Bombay. N. lat. 19° 13'. E. long. 72° 53'.

**Tanna**, or Thana, a town of Saxony, in the county of Reuffen; 17 miles S.W. of Greitz. N. lat. 50° 25'. E. long. 11° 57'.

**Tanna Balloo**, a small island in the East-Indian sea, near the east coast of Borneo. N. lat. 4° 52'. E. long. 118° 21'.

**Tanna Mera**, a small island in the East-Indian sea, near the east coast of Borneo. N. lat. 3° 45'. E. long. 117° 5'.

**Tannar**, a town of Bengal; 35 miles E.S.E. of Moorshedabad.

**Tannas**, a town of Sweden, in Harjedalen; 15 miles N.W. of Langafalschant.

**Tannaser**, a town of Hindoostan, in the subah of Delhi. This place was formerly held facred by the Hindoos. In 1611 it was taken by Manhood, king of Gизи; 45 miles N.E. of Ilifar. N. lat. 29° 31'. E. long. 76° 20'.

**Tannay**, a town of France, in the department of the Niwe; 16 miles S.E. of Clermancy.

**Tanndorf**, a town of the principality of Culmbach; 8 miles S. of Culmbach.

**Tanneberg**, a town of Austria; 8 miles S. of Aigen.

**Tanned Hide. See Hide and Leather.**

**Tannenberg**, in Geography, a town of Prussia, in the province of Oberland; 6 miles S.S.W. of Hohenstein.—Also, a town of Saxony, in the circle of Erzgebirg; 6 miles S.W. of Wolkenstein.

**Tanner, Thomas**, in Biography, an English prelate, and eminent antiquary, was the son of a clergyman, who was vicar of the parish of Market Levington, in Wilthire, where he was born in the year 1674. He entered into Queen's college, Oxford, in 1689, and having graduated as B.A., he removed to All-Souls college in 1694, of which he became a fellow in 1696. At the university he devoted himself very much to the study of antiquities, and in 1695 published his "Notitia Monastica," or "A Short Account of the religious Houses in England and Wales," which attracted notice; and soon after Dr. Moore, bishop of Norwich, appointed him his chaplain, and in 1701 made him chancellor of his diocese; which office led him to acquire an extensive and correct acquaintance with municipal and ecclesiastical law, so that he was often consulted by the dignitaries of the church. Having married the bishop's daughter, he obtained in succession various preferments; and in 1710 he took the degree of D.D. In 1723 he became canon of Chrift-church, Oxford; in 1727, provost of the lower house of convocation; and in 1732, bishop of St. Alph. He died at Chrift-church, in 1735, where he was buried. He was twice married, but left only one son. He was distinguished by the exemplary discharge of his clerical functions, and by the liberality of his charities. Availing himself of papers presented to him by Wood, he published a second edition of his "Athenæ Oxonienses," much corrected and enlarged, with the addition of more than five hundred lives from the author's MS. Lond. 1721. 2 vols. fol. A posthumous work, founded on his Notitia, and entitled "Notitia Monastica; or, an Account of all the Abbeys, Priories, and Houses of Friars, heretofore in England and Wales, and also of all the Colleges and Hospitals founded before 1540," was published by his brother, the Rev. John Tanner, Lond. 1744. fol. Another elaborate work, on which he had bestowed the application of forty years, entitled "Bibliotheca Britanniæ-Hibernica; five, de Scriptoribus qui in Anglia, Scotia, et Hibernia, ad Sæculi xvii. initium floruerunt, litterarum ordine juxta familiarium nomina difpositis Commentarius, &c." was published in 1748, fol, under the care of Dr. Wilkins, who prefixed to it a learned preface. He had also made collections for the history of his native county of Wilt, but by removal to a distance he was prevented from prosecuting his design. To the Bodleian library he bequeathed many valuable papers, tending to illustrate the history of these islands, and he made several communications of a similar nature to the Society of Antiquaries, of which he was a member. His various labours in this way rank him among the most valuable contributors to British literature and ecclesiastical history. Biog. Brit. Gen. Biog.
TANNER, a person who manufactures hides and skins by tanning.

It is only within a few years past, that the tanners of this country have been liberated from a variety of penalties and prohibitions, which were extremely opprobrious, and long retarded the progress of the manufacture.

In the reigns of Elizabeth and James I., when patents of monopoly were in existence—when the true principles of trade were not well understood—and when the leather manufacture was conducted by unskillful persons, some rules and regulations as to the mode and manner of tanning, the materials to be employed, and the time to be consumed in the process, might, perhaps, be in some degree necessary: but such prohibitions and restrictions were wholly inapplicable to the present enlightened age. It was not, however, till 1683, after a long parliamentary investigation, that the act 1 James I. c. 22, and others of a similar tendency which had long disgraced our statute-book, were at length repealed by the 48 Geo. III. c. 60. By this act, the tanner is now allowed, like all other manufacturers, to exercise his ingenuity in the discovery of new materials or new methods, in abbreviating the time or improving the process. Nor can any injury thereby arise to the community; for the competition which in this country exists in every branch of trade, combined with the credit and the interest of the parties, will always insure to the public the production of the best articles which can be manufactured. See Leather, Tawing, and Velum.

Tanner's Bark, is the bark of the oak or other tree, which, after it has been ground in a mill into a coarse powder, is used in tanning of leather. When the tanning principle has been wholly exhausted, it is taken out of the pits, and called tan. It is then sold to the garderners, who use it in hot-houses to produce an artificial heat, for the purpose of raising pine-apples, &c. After a certain time the tan ceases to cause fermentation: it is then taken out of the hot-house, and, when entirely rotted, becomes a vegetable mould, and is employed as a manure in kitchen-gardens and on grazes-land.

With respect to its advantages as a manure, different opinions are entertained. Miller, Mortimer, and others, have represented it as highly nutritious, while more modern agriculturists consider it of very little value. When, however, it is blended and incorporated with other vegetable substances, or with lime or earthy matter in certain proportions, cautiously employed, and laid on soon after Michaelmas, it will be found a good top-dressing for flint and cold grass-land.

TANNETE, in Geography, a town on the W. coast of the island of Celebes. S. lat. 4° 14' E. long. 120° 4'.

TANNEWANG, a river on the S. coast of the island of Celebes, which runs into the sea, 3 miles W. of Bouthain.

TANNAHAUSEN. See Thannhausen.

TANNIN, in Vegetable Chemisty, a peculiar substance which is naturally formed, and exists in a great number of vegetable-bodies, such as oak bark, galls, sumach, catechu, &c. Its name is derived from the effect it has in converting the gelatine into leather.

Several processes have been given to obtain pure tannin, which have been so various in their results, as to induce chemists to suspect the identity of tannin.

The process recommended for procuring pure tannin, is to powder nut-galls, and make an infusion in water, which will be of a deep brown colour. Evaporate the infusion with a gentle heat till it is very strong, but still retaining its humidity. Add to this a saturated solution of carbonate of potash. A yellowish-white precipitate is formed, which is said to be pure tannin. When the liquid part is poured off, a little cold water must be added to wash the precipitate, as a large quantity would dissolve it again. When the precipitate is separated and dried, it assumes the appearance of resin, having a vitreous fracture. It is of a brown colour. Its taste is bitter, and strongly astringent. It is very soluble in water. The solution becomes frothy by agitation, as if it contained soap. It dissolves still more plentifully in alcohol. The solution is of a dark-brown colour, differing little in its properties and appearance from what has been termed tincture of galls.

For our first knowledge of this substance in a definite state, we are indebted to Deyeux. Seguin afterwards separated it by means of a solution of gelatine, the matter which was precipitated being a substance, having the fineness and many other properties of leather. These facts led to the great improvements he made in the process of tanning, of which no true theory was known before his time.

For a more minute investigation of the properties of tannin, we are indebted to Proult. He obtained his tannin by adding an acid to a concentrated infusion of nut-galls. A precipitate is obtained of the consistency of pitch. This precipitate is to be washed with a little cold water, with the same caution observed in the last process. The precipitate is now to be dissolved in boiling water, and carbonate of potash added, which takes up the acid and precipitates the tannin.

Proult recommends the following processes for procuring pure tannin. Drop into an infusion of nut-galls, a solution of muricate of tin. This gives a yellow precipitate, which being separated, washed, and dried, is of a buff-colour. This is a compound of oxyd of tin and tannin. He then mixes this powder with water, and passes through it sulphuretted hydrogen gas. The sulphur combines with the tin, and becomes insoluble, while the tannin dissolves in the water. When the sulphuret is separated, and the solution of tannin evaporated with a gentle heat, a brown tannate is left behind, which he considered as pure tannin.

Another process for obtaining tannin from infusion of nut-galls, has been given by Merat Guillot. This consists in mixing pure water with an infusion of galls. If to this mixture dilute nitric or muriatic acid be added, a deep brown precipitate is formed, which, when dry, becomes black. This he supposes to be pure tannin.

Trommelhoff has shewn that all these processes are insufficient to produce pure tannin. As the substance called extract was contained in all the above precipitates, and more or less gallic acid, he made a great number of experiments to obtain pure tannin; and although he obtained it nearer to a flake of purity than any of his predecessors, his labours were not completely successful. He evaporated the infusion of galls with a gentle heat to one-fourth of its bulk. The liquid became muddy from the precipitation of extractive matter, and was separated by draining. This liquid was now further evaporated to the consistence of jelly, and ultimately dried by a gentle heat. He now digested the masses with pure alcohol, till no more gallic acid could be taken up. He then considered the masses left behind as pure tannin, or nearly so. In order to ascertain if it still contained extract, he re-dissolved it in pure water, and evaporated this and future portions of water from it, judging that if any extract still remained it would become insoluble by oxygenation, and thus be precipitated, but no deposition took place. Suspecting it might contain mucilage, he left the solution in a warm place for some time. It became covered with mould, which he attributed to the presence of mucilage. The mould was separated by filtration, and the solution evaporated.
TANNIN.

ated to drynefs, which left the tannin in a flate of consider-able purity.

He still, however, found that it contained a portion of sulphate of lime. In order to separate this salt, he dissolved the tannin in water, to which he added carbonate of potash: this caused a precipitation, which has been already noticed. The clear liquor being separated, a solution of acetate of lead was added to it. A precipitate fell down, which consisted of tannin, combined with oxyd of lead, and probably sulphate of lead. The lime also combined with the tannin, forming an infusible compound. He then separated this precipitate, mixed it with water, and passed a stream of sulphuric hydrogen gas through it. The lead and sulphur became separated, and the combination of lime and tannin unchanged, while the pure tannin remained in solution, which was obtained by evaporating the separated liquid to drynefs. The tannin thus obtained, approaches much nearer to purity than that obtained by any of the former processes. But we shall shew further on, that, even in this state, its purity is doubtful.

Tannin obtained by the above process does not differ much from that formed by the other processes. We have already stated it to be soluble in alcohol; when, however, both the tannin and alcohol are pure, the tannin does not dissolve.

Most of the metallic oxyds form infusible compounds with tannin. There is, however, great reason to believe that the gallic acid, which is difficult to separate from it, has a much greater effect upon these bodies. It is sup-posed that when the metallic oxyds are precipitated by tan-nin, the latter combines with the oxyd, and, in some instances, converts the tannin into extract.

The common method of detaching the presence of tannin is by a solution of gelatine in water. Ingenuity is mostly used for this purpose. The solutions both of the tannin and the gelatine should be in a considerably concentrated state; as weak solutions of either redifflue, to a certain extent, the precipitate which the tannin forms with the gelatine.

The gelatine should be quite fresh, as the precipitate is imperfect when it has the least signs of putridity.

Sir Humphrey Davy states that the proportion of the gelatine to the water should be 120 grains of the former to 20 ounces of the latter.

According to the authority of the same chemist, the com-pound formed by the tannin and gelatine dried at 150°, is composed of

| Gelatine | - | - | 54 |
| Tannin  | - | - | 46 |
| **100** |   |   |   |

Potasf, soda, and ammonia, combine with tannin, forming compounds which are less soluble in water than pure tannin. These alkalies have a stronger attraction than gelatine for tannin; as the alkaline solutions do not precipitate gelatine till the alkali is saturated by an acid.

The combinations of the earths with tannin are mostly infusible. Those with barites and lime are slightly so, and do not precipitate gelatine till an acid is added.

Most of the acids form infusible compounds with tannin; but when extract is present, it is also precipitated; hence the imperfection of the process for separating tannin by acids.

When perfectly free from gallic acid it has no action upon sulphate of iron; but it produces a deep blue precipitate from the oxy sulphate: hence its effect in common writing-ink and black dye. The black is not complete without exposure to the air. The precipitate which the tannin forms is very heavy, and almost immediately separates from the water; while that formed by the gallic acid remains longer suspended, and certain, on that account alone, is an essential ingredient in writing-ink.

Tannin exerts in a great number of vegetables in some proportion, but is the most abundant in nuts; and of them, the Aleppo galls afford the most. Sir Humphrey Davy has given the following analysis of the Aleppo galls. He extracted, by infusion with water, all the soluble part from 500 grains of powdered galls. This solution he submitted to slow evaporation, from which he obtained, in solid matter, 185 grains. These he found to consist of

| Tannin      | - | - | - | 130 |
| Gallic acid, with extractive matter | - | - | - | 31 |
| Mucilage and matter rendered infusible | - | - | - | 12 |
| Calcareous earth and saline matter | - | - | - | 12 |
| **185** |   |   |   |   |

We are indebted to the same distinguished chemist for bringing into notice a new substance, which contains a large proportion of tannin. This substance is brought from the East Indies, and is known by the names of catechu, or terra Japonica. It is produced by the evaporation of a vegetable infusion from the wood of a species of *mimosa*, which grows in India.

There are two varieties of this substance, one brought from Bengal, and the other from Bombay. The former is of a chocolate colour, of the specific gravity 1.28; the latter of a lighter colour, of the specific gravity 1.30. Both have an agreeable taste, leaving an impression of sweetness. They are not changed by exposure to the air.

Sir Humphrey procured an infusion from this substance by long decoction, the specific gravity of which was 1.162: 500 grains of this infusion yielded, by evaporation, 41 grains of solid matter; 34 of which were tannin, and 7 of a peculiar extractive matter.

This substance, in its original state, seems to contain a very large proportion of tannin. The above chemist found that 100 grains of the powdered catechu required 18 ounces of water for its infusion. The residuum, or undiffusible part, is seldom more than 1/4th of the original weight, and consists of calcareous and aluminous earth, with a little fine sand: 200 grains of the Bombay catechu gave

| Tannin      | - | - | - | 109 |
| Peculiar extract | - | - | - | 68 |
| Mucilage    | - | - | - | 13 |
| Of the residuum above-mentioned | - | - | - | 10 |
| **200** |   |   |   |   |

The catechu from Bengal gave, in 200 grains,

| Tannin      | - | - | - | 97 |
| Peculiar extractive matter | - | - | - | 73 |
| Mucilage    | - | - | - | 16 |
| Residual matter, consisting of lime, alu-mine, and sand | - | - | - | 14 |
| **200** |   |   |   |   |
The great uncertainty which has prevailed respecting the definite nature of tannin, seems to have been completely removed by the very important discovery made by Mr. Hatchett, who has succeeded in forming artificial tannin. An account of his experiments may be found in three papers in the Philosophical Transactions for 1805 and 1806.

The most direct process which is given for obtaining it, is by pouring an ounce of nitric acid, diluted with two parts of water, upon 100 grains of charcoal, in a mortar. This is to be placed in a land-heat. Great evaporation takes place, and much nitrous gas is disengaged. At the end of two days he added a second ounce of acid, and sometimes even a third. The digestion is continued till the whole is dissolved. This solution is of a reddish-brown colour. It is then to be slowly evaporated to dryness, which produces a brown glossy substance, exhibiting a rough fracture.

This substance has the following properties:
1. It dissolves in cold water and alcohol.
2. The flavour is highly astringent.
3. Exposed to heat, it smokes a little, swells up, and affords a bulky coal.
4. The solution in water reddens litmus paper.
5. It copiously precipitates the metallic salts, especially the muriate of tin, acetate of lead, and oxysulphate of iron. The precipitates are commonly of a brown colour.
6. It precipitates gold in the metallic state.
7. It precipitates the earthy salts; such as the nitrates of lime, barytes, &c.
8. When the alkalies are added to this solution, the colour becomes deeper, and ultimately turbid.

A solution of infilafs added to the same solution produces a precipitate, which is insoluble in boiling water, resembling in its essential properties the precipitate formed by the natural tannin.

Mr. Hatchett produced the same substance by treating various kinds of coal in the same way, such as pit-coal, coke, and animal charcoal. What may seem very curious, he formed it from the coal of one portion of infilafs to precipitate another portion dissolved in water; and hence affords a proof that one portion of the skin of an animal may be employed to convert the other into leather.

Of the different substances employed, he found those the best which consisted of carbon unmixed with other vegetable matter, which always reduced the quantity; and that those vegetable substances which contained gum or mucilage, produced the least tannin.

When he succeeded in producing tannin from other vegetable substances, such as indigo, resin, lac, and many other bodies, it was by repeatedly adding fresh nitric acid; by which he very properly supposes that the carbon becomes separated, so as to put it under similar circumstances to the charcoal itself. Indigo produced the most in this way.

At the commencement of his paper he mentions the fact of Mr. Chenewix having found that coffee-berries acquired, by roasting, a portion of tannin. He made some experiments which, although not very successful, convinced him that the chief characteristic properties of tannin may be formed or developed at some particular temperature and under favourable circumstances, by very simple means.

He ingeniously conjectures, that the tannin found in some varieties of peat has been produced in this way.

In making use of sulphuric acid to char various substances, he found that, in some infusions, the artificial tannin, or a substance nearly resembling it, was formed. He first dissolved 100 grains of camphor in an ounce of concentrated sulphuric acid. The camphor first dissolved, without producing much change of colour. In a little time it became brown, and ultimately black. During this change, sulphuric acid gas was disengaged. After two days, during which time the alembic had not been heated, the disengagement of gas diminished, and the vessel was placed in a moderately heated sand-bath. This increased the action. At the end of two days, six ounces of cold water were added; the liquid changed to a reddish-brown colour; the disengagement of gas ceased, and was succeeded by a smell resembling a mixture of the oils of lavender and peppermint. By gradual dilution, the water came over impregnated strongly with the above odour, and accompanied by an essential oil, which weighed three grains.

When the whole water had come over, two ounces more were added. The smell before mentioned did not return, and the evaporation was continued to dryness. The blackish-brown residuum was not acted upon by water, but by several digestions with alcohol, leaving behind a compact coaly residuum, which, when dried and heated to a red heat in a close vessel, weighed 53 grains. The alcohol was then drawn off from the solution by distillation in a water-bath, leaving a blackish-brown mass, of the appearance of a gum resin, and the smell of camphor. Its weight was 49 grains. The whole of this therefore consisted of

The essential oil above-mentioned - - - - 3
A compact hard coal in small fragments - - - - 53
And the blackish-brown mass above-mentioned - - - - 49

This increase of five grains Mr. Hatchett attributes to the oxygen united to the carbon by the acid, or the water combined with the blackish-brown substance.

This latter substance had the following properties:
1. It had an astringent taste, and when dissolved in cold water, formed a dark-brown solution.
2. It yielded a dark-brown precipitate with sulphate of iron, acetate of lead, muriate of tin, and nitrate of lime.
3. It precipitated gold in its metallic state.
4. It formed a complete precipitate with a solution of infilafs, that the liquid became colourless as water.

The precipitate was nearly black, and was, like the other compounds of tannin and gelatine, insoluble in hot water.

Mr. Hatchett observes that although this substance possesses the general character of that obtained by the nitric acid with charcoal, yet it seems to act less powerfully upon skin. The precipitate, at the time of its formation, is more flocculent and less tenacious than that produced by the other procés.

Mr. Hatchett supposes this difference may arise from the want of azote, which seems to exist in that produced by nitric acid and charcoal.

He ascertained this by subjecting to analysis a portion which had been prepared from vegetable charcoal. He expanded in a retort some of this tannin in the dry state, to the heat of a lamp connected with a jar, to obtain the gaseous product.

First a small quantity of water rose; then a little nitric acid, which had not been expelled in the evaporation. Next a small quantity of yellowish liquor, which filled the neck of the retort. The fire was then raised, when a quantity of gas was explosively disengaged, and upset the jar. This gas he judged from the smell to be ammonia. He also observed
observed some white fumes, which resulted from the nitric acid uniting with the ammonia.

On replacing the jar, he continued the process. The future gas which came over was carbonic acid, and a little of another, which he supposed to be nitrogen.

Although the artificial tannin appears in almost every respect similar to the natural tannin, it might be expected that each would have been similarly affected by nitric acid, yet Mr. Hatchett found that the one was destructible by that acid, while the other was not in the least affected by it. He frequently distilled nitric acid from the artificial tannin, without producing any change upon it.

The tannin, to which gas was added to infusion of galls, sumach, Pega cutch, and kafeutti, completely destroyed the tannin. The common catechu and oak bark treated in the same way, had not the whole of their tannin destroyed. He then made infusions of equal strength of nutgalls, sumach, shavings of oak wood, oak bark, and the artificial tanning substances. To half an ounce of each of these, one dram in measure of strong nitric acid was added. The tannin of all were destroyed, with the exception of the oak bark and the artificial tannin. Mr. Hatchett observes that the tannin of those bodies containing much mucilage is the most liable to destruction by the nitric acid; and that in the cases where the tannin is destroyed, the oxalic acid is most formed. The oak bark and the common catechu contain little or no mucilage, and hence have less of their tannin destroyed.

These facts seem to prove that pure tannin, unmixed with other matter, is not affected by nitric acid, and that in those instances in which it is destroyed, the effect must arise from some new substance being formed by the action of the acid upon the extraneous matter, and also that mucilage contributes the most to this change.

Mr. Hatchett has not given us any precise analysis of this substance, but concludes, from its formation, that it has carbon for its base. From the circumstance of its being formed with greater facility when the nitric acid is diluted, he thinks that the water is decomposed, and that the hydrogen enters into its composition.

In the case of its decomposition by heat, the formation of ammonia led him to believe that azote was also one of its elements.

This, however, does not agree with the fact of its being formed with sulphuric acid and vegetable matter only. Although this objection seems partly to be removed by the circumstance of the tannin from sulphuric acid being different in some of its properties from that produced from the nitric acid and charcoal, it may, however, be here observed that the natural tannin, which is not known to contain azote, more nearly resembles that formed with nitric acid, than that from the sulphuric acid.

It does not appear probable that azote is a component part, even of the natural tannin. The ammonia which Mr. Hatchett obtained might be in combination with the tannin, and may perhaps always be formed when the tannin is formed. The circumstance of the tannin not being changed by repeatedly digesting it with nitric acid, would seem to favour the idea of its confining of carbon and oxygen only. The importance of this substance in the art of tanning, ought to be a sufficient stimulus to future experiments.

If in the process of forming artificial tannin, the nitric acid is decomposed merely into nitrous gas, it might be practicable to bring it back to its original state by the oxygen of the atmosphere only, and thus produce a valuable product, which is now obtained at considerable expense from certain vegetables.

The following table shews the proportions present of natural tannin in a variety of substances.

<table>
<thead>
<tr>
<th>Tannin</th>
<th>By the Hydroxeter.</th>
<th>Weight in Grains.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Catechu from Bombay</td>
<td>-</td>
<td>2.1</td>
</tr>
<tr>
<td>Bengal</td>
<td>-</td>
<td>2.1</td>
</tr>
<tr>
<td>Aleppo nutgalls</td>
<td>-</td>
<td>2.1</td>
</tr>
<tr>
<td>Sumach</td>
<td>-</td>
<td>2.2</td>
</tr>
<tr>
<td>Souchong tea</td>
<td>-</td>
<td>2.4</td>
</tr>
<tr>
<td>Green tea</td>
<td>-</td>
<td>3.0</td>
</tr>
<tr>
<td>Leicestershire willow bark</td>
<td>-</td>
<td>3.0</td>
</tr>
<tr>
<td>Oak bark</td>
<td>-</td>
<td>3.0</td>
</tr>
<tr>
<td>Spanish chefnut</td>
<td>-</td>
<td>3.0</td>
</tr>
<tr>
<td>Elm bark</td>
<td>-</td>
<td>3.0</td>
</tr>
<tr>
<td>Common willow bark</td>
<td>-</td>
<td>2.5</td>
</tr>
</tbody>
</table>

Mr. Biggin also has published, in the Philosophical Transactions for 1799, the result of some experiments on the proportions of tannin in various kinds of bark, which nearly correspond with the preceding statement, as will be seen by the following table, in which the maximum of the tanning principle is supposed to be 20.

<table>
<thead>
<tr>
<th>Tanning Principle.</th>
<th>By the Hydroxeter.</th>
<th>Weight in Grains.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elm</td>
<td>-</td>
<td>2.1</td>
</tr>
<tr>
<td>Oak (cut in winter)</td>
<td>-</td>
<td>2.1</td>
</tr>
<tr>
<td>Horfe chefnut</td>
<td>-</td>
<td>2.2</td>
</tr>
<tr>
<td>Beech</td>
<td>-</td>
<td>2.4</td>
</tr>
<tr>
<td>Willow (boughs)</td>
<td>-</td>
<td>3.0</td>
</tr>
<tr>
<td>Elder</td>
<td>-</td>
<td>4.0</td>
</tr>
<tr>
<td>Plum-tree</td>
<td>-</td>
<td>4.0</td>
</tr>
<tr>
<td>Willow (trunk)</td>
<td>-</td>
<td>4.1</td>
</tr>
<tr>
<td>Sycamore</td>
<td>-</td>
<td>4.1</td>
</tr>
<tr>
<td>Birch</td>
<td>-</td>
<td>4.1</td>
</tr>
<tr>
<td>Cherry-tree</td>
<td>-</td>
<td>4.2</td>
</tr>
<tr>
<td>Sallow</td>
<td>-</td>
<td>4.6</td>
</tr>
<tr>
<td>Mountain ash</td>
<td>-</td>
<td>4.7</td>
</tr>
<tr>
<td>Poplar</td>
<td>-</td>
<td>6.0</td>
</tr>
<tr>
<td>Hazel</td>
<td>-</td>
<td>6.3</td>
</tr>
<tr>
<td>Alth</td>
<td>-</td>
<td>6.6</td>
</tr>
<tr>
<td>Spanish chefnut</td>
<td>-</td>
<td>9.0</td>
</tr>
<tr>
<td>Smooth oak</td>
<td>-</td>
<td>9.2</td>
</tr>
<tr>
<td>Oak (cut in spring)</td>
<td>-</td>
<td>9.6</td>
</tr>
<tr>
<td>Huntingdon or Leicestershire willow</td>
<td>10.1</td>
<td>109.</td>
</tr>
<tr>
<td>Sumach</td>
<td>-</td>
<td>16.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>158</td>
</tr>
</tbody>
</table>

It appears from this table that similar barks, when taken from trees at different seasons of the year, differ as to the quantities of tannin contained in them. In the winter they contain the leaf, and in the spring (which is the usual time of felling oak-timber), if the season is very cold and ungenial, the quantity is diminished. This is well known to practical men, as likewise that all barks contain the greatest proportion of tannin; at the time when the buds of the trees begin to germinate. It is found by experience that, on an average, four or five pounds of good oak bark are required to form one pound of leather.

Sir Humphrey Davy observes that the affrangent principles in barks vary considerably, according as their age and size are different. That in every affrangent bark, the interior white bark (which is the part next to the alburnum) contains the largest quantity of tannin. The proportion of extractive matter is generally greatest in the middle; but the epidermis seldom furnishes either, tannin or extractive matter. The white cortical layers are, comparatively, most abundant in young trees; and hence their barks contain, in the same weight, a larger proportion of tannin than the barks...
barks of old trees. (Phil. Trans. 1803, p. 264.) From these observations, founded on experiments, Mr. Hatchett infers that there is an intimate connection between the formation of new wood and the formation of tannin in such vegetables as afford the latter; and this idea is corroborated by the chemical nature of those substances.

It has been suggested that the extractive matter found in barks, or in substances used in tanning, affects the colour, not the quality of leather. Thus, skin tanned with gall-nuts is much paler than skin tanned with oak bark, which contains a brown extractive matter. Leather made from catechu is of a reddish tint.

It is found that the precipitates obtained from infusions containing this principle or tannin by infusions, when dried, contain at a medium rate about 40% of vegetable matter; and that it is easy to obtain the comparative value of different substances for the use of the tanner, by comparing the quantities of precipitate afforded by infusions of given weights mixed with solutions of glue or infusions.

In order to make experiments of this kind, an ounce or 480 grains of the vegetable substance in coarse powder, should be acted upon by half a pint of boiling water; the mixture should be frequently stirred, and suffered to stand twenty-four hours; the fluid should then be passed through a fine linen cloth, and mixed with an equal quantity of solution of gelatine, made by dissolving glue, jelly, or infusions in hot water, in the proportion of a drachm of glue or infusions, or five table spoons full of jelly, to a pint of water. The precipitate is to be collected by palling the mixture of the solution and infusion through folds of blotting paper, and the paper exposed to the air until its contents are quite dry.

If pieces of paper of equal weights are used, in cases in which different vegetable substances are employed, the difference of the weights of the papers when dried, will indicate, with tolerable accuracy, the quantity of this principle or tannin contained in the infusions, and their relative value for the purposes of manufacture.

TANNING, the art of converting the gelatinous part of the skins of animals into the substance called leather, by impregnating it with tannin or the tanning principle, in such a manner as to render it tenacious, durable, and impervious to water.

It is difficult to say at what period the art of tanning was discovered. It was doubtless known to the ancients in some degree of perfection; and it is highly probable that the skins of animals were employed by man as a covering long before the art of tanning was known: but they would require in this state to be constantly kept dry, as moisture would soon bring them into a state of putrefaction.

The astringent matter, which converts the skin into leather, abounds in so many vegetables in every country, that accident would soon lead to some method of producing the change. Independent, however, of vegetables, many earthy and metallic substances have the property of rendering skins incorruptible to a certain extent; and some mineral waters containing copper or iron will occasion this change. Hence we may conclude that some means of giving preservation to the skins of animals must have been known at a very early period.

Though there has been no radical alteration or any great practical improvements in the art of tanning, yet for the last twenty or thirty years it has attracted the attention of many celebrated chemists and philosophers in all countries, who have investigated the subject with great accuracy and precision. Previous to this period we occasionally find some experiments and observations by men of science on the materials of tanning, as by the Hon. Charles Howard in 1674 (Phil. Trans. vol. ix.) by the Abbé Nollet, Geigner, Cléditich, Buffon, de la Lande, and others, in Mem. Acad. Sc. Paris and Berlin.

In the year 1765, the Society of Arts and Sciences in London granted a premium of 100L for the discovery of a method of tanning with oak sawdust; and in 1795 the Rev. G. Swane suggested the use of oak leaves. It is unquestionably true that all these substances, and indeed every part of almost every vegetable in nature, possesses a certain portion of the tanning principle; but, exclusive of oak bark and two or three other well-known articles, the quantities of all the rest added together would be so inconsiderable, and the proportion of tannin contained in them so inadequate to the purposes of manufacture, that, except for philosophical curiosity and chemical experiment, they are unworthy of notice. As the theories of speculative minds they are ingenious and amusing, but they afford very little useful information on the nature and properties of tannin, and have produced no beneficial results in practice.

Deyveux, about 1793, (Annales de Chimie, vol. xviii.) appears to be the first chemist who successfully explained the true principles of tanning; which afterwards, with more practical application, were still further developed by the labours of M. Seguin in 1795. Before his investigation of this subject, the theory of tanning was strictly mechanical. The astringency of vegetables, which produced the change in the skin, was considered as a refined body, which had the effect of giving firmness to the fibres of the skin, and rendering it infusible.

Seguin saw the operation in a chemical point of view; he examined the nature of the process scientifically, and discovered that the change which the skin underwent in the operation of tanning, was the result of a chemical union between a substance furnished by the vegetable employed, and the gelatinous part of the skin. Thence principles he confirmed, by combining the vegetable substance in question with the gelatine of a solution of infusions.

It will be seen, from our article TANNING, that the compound discovered by Seguin, and which is precipitated when an infusion of nutgalls is added to a solution of infusions, is an infusible substance, having many properties common to leather. See Nicholstow's Journal, vol. i. p. 271. 470.

The practice which M. Seguin founded upon his theory was generally adopted. He first extracted the tannin from the vegetable, which was oak bark, and applied it to the prepared skin in a more concentrated form, with a view to impregnate it as speedily as possible with the tannin. This was said to be done with great success in one-third of the usual time, and to have produced superior leather. The fame of this discovery soon spread throughout Europe, and Mr. De-mond, a man of education and intelligence in this country, took out a patent for the exclusive right of using M. Seguin's method of tanning.

Although this process of suspending the hides vertically in a very strong solution of bark saved much time, yet it was soon found to be adapted only to the thickest hides used for sole leather, and quite unfit for the lighter kind of skins which required flexibility and tenacity. This method, therefore, of Seguin's, however chemical and philosophical it might appear, did not answer in the result; and as it was attended with much additional expense, has never been generally practiced in England.

It was not, however, till 1803, when Sir Humphrey Davy (a name ever to be recorded in the annals of science with gratitude and admiration) began to investigate the sub
TANNING.

In the two valuable papers which Sir Humphry Davy has given in the Philosophical Transactions for 1803, he considers the process of tanning as depending chiefly on the chemical union of the tanning principle with the matter of skin, so as to form an infusible compound. He has shown that Seguin’s quick method of tanning is not the best; because the exterior strata of the skin being perfectly combined with tannin, before the interior strata are materially acted upon, thereby prevent the latter in some degree from imbibing the full action of the solution. This renders the texture of the leather less equal, makes it harsh and brittle, liable to crack, and of course less durable.

Sir Humphry thinks it probable that another substance, besides tannin, combines with the skin, namely, the extract, to which it owes much of its suppleness and tenacity—that the leather gets more of this substance from weak infusions of bark, than from the strong ones recommended by Seguin—that it is equally infusible in water—and that, upon the whole, the methods now generally in use, may, with a few alterations, be considered the best.

The various discoveries pretended to have been made, and the numerous patents obtained for their use and application, have hitherto tended very little to the advancement of science or the progress of the art. This may fairly be inferred from the conclusion of the celebrated chemist above-mentioned. Indeed it appears by the specifications annexed to the patents, that most of these projected improvements purport to be either for the different construction and arrangement of the various pits—for the application of mechanical apparatus to diminish labour—or for extracting the tannin and warming the infusion by artificial heat, with a view to accelerate the process. These fancied improvements are only the idle theories and visionary projects of speculative minds; but as it may afford information to the curious, and furnish hints for future discovery, we subjoin:

**A List of Patents for Tanning.**

1792. Anthony Fay, esq. of London, for a mechanical apparatus to diminish the labour of handling, to grind the bark very small, and to concentrate it, by boiling, into a strong extract.

1794. Samuel Ashton of Sheffield, for tanning hides and skins with certain mineral productions. As such materials were prohibited by the statute of James I. an act of parliament was passed to legalize the use of them.

1795. Mr. Tucker of Wickham, Hants, for triple pits composed of wood, metal, and bricks, to keep up a constant fire at the bottom, to warm the infusion and expedit the process.

1796. William Defmond, esq. of London, for a new mode of tanning, according to M. Seguin’s method, as before stated.

1797. Robert Croft of Lancaster, for pits on a new construction, to enable him to apply artificial heat and to tan quickly.

1799. Francis Brewin, esq. of London, for a peculiar construction and arrangement of pits, and for the use of machinery, &c.

1802. John Lawrence, for the use of oak sawdust in tanning.

1802. Thomas Martin of London, for constructing pits on a new plan, &c.

1802. John Cant and John Miller of Moutrofe, for boiling the bark, &c. so as to extract the tanning principle more effectually.

1807. Robert John Stanley of Lincolnshire, for tanning light leather without bark, for a peculiar preparation previous to the application of oak, and for boiling the materials of tanning.

1812. Sparks Moline, for the use of the solid extract of bark.

1815. Thomas Ashmore, esq. for the use of all kinds of foot, whether from coal, wood, peat, or bones, and the oils and empyreumatic liquors arising from them by distillation or combustion, to be applied to the purposes of tanning.

The utility of the last-named patent, we shall give no opinion at present; but of the remainder it may be affirmed that none of the methods therein recommended have ever been much practised: Some of them which were adopted by a few individuals, were attended with considerable loss; and as most of them are now laid aside, we may reasonably conclude that they have not proved beneficial to the projector or to the public.

Before we describe the present method, it may be necessary to premise, that in different parts of the kingdom, the same terms and denominations are sometimes employed to designate different kinds of leather; but all tanned leather is technically classified and universally known under two general denominations: namely, hides and skins. The former term being commonly applied to the larger animals, as bulls, oxen, cows, &c. which are chiefly intended for the foles of stout shoes, and other purposes requiring very thick and solid leather; while the latter term is used for calfs, skins, &c. which, being thinner and more flexible, are intended for the upper leathers of shoes and boots, for saddles, harnesses, &c.

The heaviest and stoutest of the bull and ox hides are generally selected to make what are technically called butts or backs, and are manufactured in the following manner. When the horns, &c. have been removed, the raw hides are laid on a heap for two or three days, and are then piled up or poles in a close room, called a smoke-house, which is heated somewhat above the common temperature by a smouldering fire: this occasions incipient putrefaction, which


which loosens the epidermis, and renders the hair and other extraneous matter easy of separation from the true skin. This is effected by extending the hide on a wooden horse or beam of a convex form, and scraping it with a large two-handled knife, called a flaying-knife, which is bent, to suit the convexity of the beam.

The hides are then immerged in a pit containing water slightly impregnated with sulphuric acid. This operation, which is called raising, by diffusing the pores and swelling the fibres, prepares thehide for the reception of the tannin, and renders it more susceptible of its action.

When the hides are sufficiently raised, they are removed into a pit, in which they lain smooth with a stratum of oak bark ground to a coarse powder between each.

The pit is then filled with the tanning lixivium or ooze, prepared from oak bark and water, and the hides remain a month or six weeks without being moved. At the end of this time, the tanning principle being exhausted, the ooze and spent bark are taken out of the pit, and the hides put in again, impregnated in fresh bark, and covered with fresh ooze as before. Here they remain about three months, when the same process is repeated, at about the same intervals, three several times or more, according to the strength of the lixivium and the fineness of the hides. When sufficiently tanned, they are taken out of the pit, hung up in a shed to dry gradually, and being compressed with a steel instrument, and beaten smooth to render them firm and dense, the operation is complete; and having been numbered, weighed, and stamped by the excise officer, to ascertain the amount, and denote the payment of the duty (which will be noticed at the end of this article), they are ready for sale, and are termed butts or backs. These form the thickest and most substantial sole leather for very strong shoes, and are chiefly intended for exportation.

Crop hides are thus manufactured. The horns having been removed, the hides are immered in pits containing a mixture of lime and water, where they remain three or four days, being occasionally moved up and down, that each part may be uniformly exposed to the action of the lime-water. They are then taken out of the lime-pits, and the hair and other extraneous matter being scraped off on a wooden beam, as before defibbered, are washed in water, to free them from the lime and fiber adhering. They are now immered in a weak ooze, and by degrees are removed into other pits containing solutions gradually increasing in strength, during which time they are taken up and put down (technically termed handling) at least once in every day, that all parts of the hide may be acted upon by the tanning principle equally and uniformly. This is continued for about a month or six weeks, when they are put into other pits with stronger ooze and a small portion of ground bark; from whence, as the tannin becomes exhausted, they are removed to other pits in regular succession, with fresh ooze and fresh bark, for two or three months.

At the end of this period, the hides are put into larger vats, called layers, in which they are stratified, or lain smooth, in a lixivium of greater strength, and with a larger quantity of ground bark between each fold. Here they remain about six weeks, when they are taken up and relaid in the same manner, with fresh bark and strong ooze, for two months. This process is repeated, with little variation, once, twice, or thrice, at the discretion of the manufacturer, till the hides are thoroughly tanned; when they are taken out of the pits, suspended on poles to dry, and being compressed and smoothed, nearly in the manner before defibbered, are called crop hides, and form the principal part of the sole leather which is used in England.

Vol. XXXV.
probability that the tanning principle will, at some future period, be formed artificially in such quantities and at such expense as will admit of its general application to practical purposes. The important discovery of Mr. Hatchett already goes far towards the accomplishment of this object. He has distinctly ascertained that a substance very analogous to tannin may be produced by expelling carbonaceous matter, whether vegetable, animal, or mineral, to the action of nitric acid; and has actually converted skin into leather by deal flour, asphaltum, pit-coal, wax-candle, and even by a part of the same sort of skin itself. The changes produced in these bodies, by dissimulating and recombinating their elementary principles, may by further development lead to a more economical process of tanning, and thus render essential service to the arts and manufactures.

Tanned leather is subject to a very heavy excise duty. In the ninth year of Queen Anne, a duty of 1/4. per lb. was laid on all hides and skins tanned in Great Britain. In the following year an additional 1/3. per lb. was imposed. Thus it remained, amidst all the financial difficulties of successive chancellors of the exchequer, till 1812, when, by the act 52 Geo. III. c. 94, a further duty of 1/2. per lb. was added, making the whole duty on tanned hides and skins 3d. per lb. The annual revenue arising therefrom now amounts to upwards of $50,000.

It may not be improper here to remark, that the excise duty on leather tanned in Ireland, is levied and collected in a different manner.

The act 40 Geo. III. c. 9, passed in Ireland in 1800, instead of imposing a certain duty per pound weight, as in England, on all hides and skins tanned with oak bark, imposed a duty of nine pence by the year, for every cubic foot contained in all the pits in the yard of the tanner, allowing a deduction of two-ninths for certain pits called lethes, which are used solely for the purpose of preparing the limewor or ooe. By this act the tanner was permitted, on giving certain notice, to discontinue not less than one-fourth, and by 43 Geo. III. c. 97, not less than one-eighth for six months, receiving a proportionate deduction from his monthly payments of the duty. By the 48 Geo. III. c. 62, those acts were made perpetual.

Previous to the passing the Irish act 40 Geo. III.: the writer of this article was consulted by the then chancellor of the exchequer in Ireland, on the relative amount of the intended duty of nine pence per cubic foot; and upon accurate calculation it was found to bear a fair proportion to the duty then existing in England. If the present duty on leather tanned in this part of the united kingdom were proportionally commuted on a similar plan, it would materially tend to the progress of the manufacture.

The chief obstacle to great practical improvement is the excise duty—not so much from its amount (though that is very considerable), as from the mode in which it is now levied and ascertained, namely, by weight, when the leather is dry and fit for sale. This mode necessarily requires a system of rules and regulations, which, from their multiplicity and complicated nature, subject the manufacturer to daily inconvenience, and to occasional hardships. For, notwithstanding the repeal of the oppressive act 1 James I. cap. 22, and other subsequent statutes, the tanner is still restricted, by various excise laws, from advantageously shaving and reducing his hides and skins—from mixing and removing them at his discretion—and also from exercising the trades of a currier, &c.

Those restrictions, it must be acknowledged, are in some degree necessary for the protection and security of the revenue, while the duties are imposed and collected upon the present system. But if a different mode of taxation and collection (as in Ireland, on the admeasurement of the pits; or on the raw material, or any other plan) could be adopted, the benefits which would result, both to the manufacturer and to the community, are incalculable. It would leave the tanner at full liberty to conduct his business entirely according to his skill and judgment, and to unite with it the trades of currier and leather-cutter, which are so naturally connected with his own. It would enable him to facilitate the process; to save much superfluous labour; to economize the materials of tanning, which are now unavoidably wasted on useless or inferior leather; to shave, divide, select, and appropriate certain hides and skins, or parts of hides and skins, at the proper time for their peculiar purposes; to prevent the injury which leather often receives in drying at particular seasons; and ultimately to improve the quality and reduce the price of one of the most useful articles of general consumption.

These are matters well worthy the consideration of the executive government and the legislature. Some attention has already been given to this subject by the house of commons in the sessions of 1815 and 1816, and we have no doubt that by further investigation, intelligent and unprejudiced persons might easily arrange and complete a plan which would afford perfect security to the revenue, would simplify the collection, would prevent the possibility of fraud, and at the same time prove extremely beneficial to the manufacture and to the public.

TANNRODA, in Geography, a town of the principality of Weimar; 9 miles S.S.W. of Weimar.

TANORE, in Geography, a town of Hindooftan, in the county of Calicut; 25 miles S.S.E. of Calicut. N. lat. 10° 58'. E. long. 75° 54'.

TANOS, in Ancient Geography, a town of the island of Crete.

TANOT, in Geography, a river of North Wales, which rises in the county of Montgomery, and runs into the Severn, 7 miles below Welfpool.

TANOUNDAIN, a town of the Birmian empire; 30 miles N.E. of Pagulam.

TANREC, in Zoology, a name given by Buffon to the Erinaceus Eecaudatus; which see.

TANSA, in Geography, a branch of the river Mobile.

TANSCHA. See TANGA.

TANSE, a town of Brazil, in the jurisdiction of St. Paul.

TANSIFT, or TANSEFF, vulgarly called Wed Marakofh, or the river of Morocco, because it passes through the district of that name, a river that rises in mount Atlas, E. of Morocco, and taking its course about five miles N. of that city, proceeds through the territory of Morocco, and Ramahana, and nearly divides the two maritime provinces of Shemda and Abda; discharging itself into the Atlantic ocean, about 16 miles S. of the town of Saffy. In its course it receives some tributary streams issuing from the Atlas, the principal of which is the Wed Niffs. In many places it is very deep; and about six miles from Morocco it is crossed by a bridge, erected by Muley El Manfor, which is very strong, but flat, with many arches. At the mouth of this river, on the N. side, amid some sands and marshes, are the ruins of a small town, called by the Moors Suera, from which the insalubrity of the air, or the inundations of the Tanis, have driven the inhabitants. On the other side of the river, which is passed by fording, or on rafts made of reeds tied to leathern bags inflated with wind, is a square castle, built in the reign of Muley Ishmael, to defend the passage of the river, during the time of the intestine disturbances of the empire. This castle at present only contains a few families; and the country round it is uncultivated.

TAN-
TANSILLO, Luigi, in Biography, an Italian poet, was a native of Nola, and born about the year 1510. The first specimen of his talents in Tuscan poetry, when he was twenty-four years of age, was his "Il Vendemmiatore," first printed in 1534, and it afterwards passed through several editions, under the title of "Stanza amorosa sopra gli orte della Donne." This poem was succeeded by another of the same licentious character, entitled "Stanza in lode della Menta." His reputation was so much fun with these publications, that all his poems and other pieces were confided by pope Paul IV. to the lift of prohibited books. The author, deeply mortified by this circumstance, addressed a penitential letter to the pope, supplicating forgiveness, and informing him that he had made reparation by composing a devout poem, entitled "Le Lagrime di San Pietro," or, "The Tears of St. Peter." The apology was admitted, and his name was erased from the list. In 1566 he was judge-royal at Gaeta, and being then declining in health, he probably did not long survive. His "Tears of St. Peter" was published, after his death, in fifteen cantos, and much applauded. It was translated into French by Malherbe, and also into Spanish. His other poems have been often printed; but the most complete edition is that of Venice in 1738. Two other elegant poems, entitled "La Balia" and "Il Podera," were published in the year 1757 and 1769. Some persons have represented Tansillo as equal to Petrarch; but though this degree of praise should not be allowed, he is considered by the best judges as one of the most elegant and spirited poets of his age. Moreri. Gen. Biog.

TANSITÀRO, in Geography, a town of Mexico, in the province of Meoacan.

TANSOR, a town of Africa, in the kingdom of Fez, 30 miles N. of Fez.

TANSOU, a town on the E. coast of Madagascar. S. lat. 15° 42'. E. long. 52° 8'.

TANSUCHE, a town of Mexico, in the province of Guatla; 83 miles N.W. of Panuco.

TAN Sy, or Tanzy, in Botany. See Tanacetum.

TANSY, in the Materia Medica. The leaves and flowers of tansy have a strong, not very disagreeable smell, and a bitter somewhat aromatic taste. They give out their virtue both to water and spirit, but most perfectly to the latter; the tincture made from the leaves is of a fine green; from the flowers, of a bright pale yellow colour. Distilled with water, they yield a greenish-yellow essiential oil, smelling strongly of the herb, and probably containing camphor; the remaining decoction, insipid, affords a strong, bitter, sublimate extract.

According to Bergius, the virtues of tansy are tonic, Romachic, antimptic, emmenagogue, and refovent, qualities usually attributed to bitters of the warm or aromatic kind. Tansy has been much used as a vermifuge, and its efficacy has been ascertained by the testimonies of many respectable physicians.

The seeds have been chiefly recommended in this last intention, and substituted for those of the santonicum, from which they differ not a little in quality as well as in appearance, being much less bitter, and of a more aromatic flavour.

Dr. Clark informs us (Eff. and Obs. Phys. and Lit. vol. iii.) that in Scotland tansy was found to be very beneficial in various cases of gout, and Dr. Cullen says, that he has known several who have taken it without any advantage, and some others who reported that they had been relieved from the frequency of their gout. Tansy is also recommended in the biliary, especially when this disease is supposed to proceed from menstrual obstructions.

The leaves of this plant may be given in powder to the quantity of 33j to 33j, for a dose twice a day; but it has been more commonly taken in infusion, or drank as tea. It is now scarcely ever used, except as an aethenic for expelling lumbries, to which it has certainly some pretensions. Lewis. Woodville. Thomson.

TANsy, Wild. See Cinquefoil.

TANT, in Natural History, an English name for a small spider of the phalangium kind, having only two eyes, and eight very long legs, and commonly supposed to be very poisonous.

It is all over of an elegant scarlet colour, resembling that of the flowers of the red poppy when full blown, except that the belly has a whitish call. Four of its legs are inserted in the upper part of the breast, and the other four near the belly; and near the origin of each leg there is a small black spot. Its body is round and full, and it is all over covered with a fine, short, velvety down. It is not unfrequent in dry pastures in the spring-seaon. It is terribly dreaded by our farmers, who suppose that an ox will die who chances to swallow it. Ray's Hill. Infects, p. 44.

TANTABEE, or Tankabast, or Lop, in Geography, a town of Little Bucharia, on the river Yarkan; 150 miles S. of Tourfan.

TANTALAM. See Ligor.

TANTALITE, in Mineralogy, the ore of a newly discovered metal called tantalum, or tantalus. (See Tantalum.) This ore has been called columbite by Mr. Hatchett, who obtained a specimen of it from Maffachusetts bay, in North America, and discovered the metal which he denominated columbium, and which is now found to be the same with tantalum. The colour of tantalite is iron-black, sometimes with a tinge of blue. It occurs imbedded in angular pieces, from the fize of a pea to that of an hazle-nut. It is also crystallized in acute octahedrons, with square bases. The surface of the angular pieces is uneven; that of the crystals is sometimes smooth, and sometimes streaked; it has a shining metallic lustre, inclining to resinos. The fracture is uneven and granular, inclining to compact, or conchoideal. The fragments are irregular, sharp, and angular. It scratches glass, and gives a few sparks with steel. The ftreak is dill, and the powder a brownish-black. The specific gravity varies from 7.15 to 7.955. The columbite, according to Hatchett, is 5.918. Tantalite is infufible before the blow-pipe, without addition; and it suffers no change but a diminution of lustre.

The constituent parts of tantalite from Finland are, according to

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxyd of tantalum</td>
<td>85</td>
<td>83</td>
<td>88</td>
</tr>
<tr>
<td>Oxyd of iron</td>
<td>10</td>
<td>12</td>
<td>10</td>
</tr>
<tr>
<td>Oxyd of manganeae</td>
<td>4</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>Oxyd of tin</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

The North American columbite contained, according to an analysis of Dr. Wollaston, 80 parts of oxyd of tantalum, 15 of oxyd of iron, and 5 of oxyd of manganeae.

Tantalite occurs in the parith of Kemito, in Finland, disseminated in coarse red granite. It bears a considerable resemblance to several other minerals, particularly to magnetic iron-flone, tin-flone, wolfram, yttriotantalite, and gadolinite. It is distinguished from magnetic iron-flone by its greater specific gravity, and by not affecting the magnetic needle; from compact black tin-flone, by its metallic lustre, and by the action of the blow-pipe, which reduces tin-flone on charcoal; from wolfram, by the absence of the foliated fracture; from yttriotantalite, by the form of the crystals,
crystals, and by refining the action of the blow-pipe, by which yttriotantalite is melted into a greenish-yellow flag; lastly, tantalum is distinguished from gadolinite, by its greater-specific gravity, uneven fracture, and infusibility. Yttriotantalite, another ore of tantalum, contains the newly discovered earth called yttria, from Ytterby, near Roejan, in Sweden, where it was first discovered. See Tantalum and Yttriotantalite.

TANTALUM, or Tantalus, the metal obtained from tantalite and yttriotantalite. The method of reduction consists in boiling the ores with alkalies, and adding nitro-muriatic acid to the solution. The oxide of tantalum is thrown down in white powder: this must be washed, dried, and strongly ignited in a crucible lined with charcoal.

Berzelius preferred the oxide into a cavity of the size of a goose-quill, made in a lump of well-burned charcoal, and exposed it to a violent heat, in a Heffian crucible. The reduced metal was not melted, but the particles of it firmly adhered together, and formed a mass, through which water would not penetrate. The grains were hard enough to scratch glass. The specific gravity, as ascertained by Dr. Wollaston, was 5.61; but as the mass had not been melted, the weight of tantalum must be something heavier.

Its colour is dark grey; and when scratched with a knife, it affames the metallic lustre, and has the appearance of iron. It may be reduced to powder by trituration; the powder is of a dark brown colour, without the smallfleext metalic lustre. This powder is not in the least altered by muriatic or nitric acids, nor by aqua regia, though it be digested with them for several days. In this respect it agrees with chrominum, titanium, o ylimin, iridium, and rhodium.

When heated to redness, it takes fire, burns feebly without flame, and goes out directly if it be removed from fire. By this means it is converted into a greyish-white matter, which may again be reduced to the metallic state by heating it with charcoal: 100 parts of tantalum, treated in this manner, combine with 8.5 or 4.5 of oxygen. But by this process it is fearedly possible to oxidize tantalum completely.

If tantalum, when pulverized, is mixed with nitre, and thrown into a red-hot crucible, a feeble detonation takes place. The mass is snow-white, and is a compound of potash and oxide of tantalum.

The mean of four experiments on the reduction of the oxide of tantalum to the metallic state, makes it a compound of 100 metal with 5.485 oxygen. The supposition that the oxygen in the water, which converts the oxide into a hydrate, is twice as great as that in the oxide, would make it a compound of 100 metal with 5.5 oxygen. Muriatic acid throws down oxide of tantalum, from its combinations with potash: it is then a hydrate of a white colour; and when washed and dried, it is composed of 100 of oxide of tantalum and 12.5 water. From experiments of Berzelius, it appears that the oxide of tantalum possesses acid properties. He succeeded in alloying several metals with tantalum, as tin, silver, and iron. Thomson's Annals, September, 1816, p. 233.

TANTALUS, in Ancient Geography, a town in the isle of Lefbos.-Allo, a town in Asia Minor, upon the bank of the Meander.

TANTALUS, one of the many names given by chemists to mercury.

TANTALUS, in Mythology, a king of Lydia, Phrygia, or Paphlagonia, according to some, but, according to others, the son of Jupiter by the nymph Plota, who is said to have presented the mangled members of his son Pelops, whom he murdered, to the gods, at a feast, in order to prove their divinity; or, according to the modern explication of this fable, he offered up his son for a sacrifice to the gods.

Others, however, have charged him with revealing the secrets of the gods, i.e. the mysteries of their worship, of which he was the high-priest. But whatever was the nature of his crime, the poets represent him as condemned to hell, and tormented there with perpetual hunger and thirst in the midst of plenty of both meat and drink. Some represent him as standing up to the chin in water, which he was incapable of reaching; or as standing under a tree, some of the branches of which, loaded with the finest ripe fruits, hung down just before his mouth, which, the moment he endeavoured to take, always rolled out of his reach. Others represent him as standing under a heavy flume, which was suspended over his head, and in which he expected would every moment fall and crush him.

Horace (lib. i. fat. i. v. 71.) seems to make Tantalus only an emblem of the covetous: as Lucretius (lib. iii. v. 1015.) makes Silphus, who is represented as bending under the weight of a great flume, or labouring to leave it against the side of a steep mountain, and which always rolls precipitately down again before he can fix it on the top, as an emblem of the ambitious.

TANTALUS, in Ornithology, a genus of the order of Grallae. Its characters are, that the bill is long, thick at the base, and somewhat incurvated; the face naked; the tongue short and broad; the noftrils linear; and the feet, with four toes, palmed at the base. Linnaeus enumerates twenty-one Species.

LOCULATOR. With a blueifh face, redifh bill, quills and tail-feathers black, and white body: the curicaca of Marcgrave, the wood peecan of Cateby, and wood ibis of Pennant. It is found in New Holland and South America.

Falcinellus. With a black face, blueifh legs, wings and tail violet, and chenifn body: the bay ibis of Pennant and Latham, and green coulifs of Buffon. A variety is the numenius cattaneus of Brizon. It is found in flocks about the lakes of Italy, south of Germany, Denmark, the Ural defert, and the Capfian and Euxine seas.


IBIS. With red face, huteous bill, grey legs, black quill-feathers, and reffih-white body: the Egyptian ibis of Latham. Found plentifully in Egypt. See IBIS.

RUBER. With face, bill, and legs red, fanifeous body, and the apices of the wings black: the guara of Marcgrave, Willughby, Ray, &c. and the scarlet ibis of Pennant and Latham. Found gregarious in the Bahama iflands, in parts of America between the tropics, particularly East Florida.

ALBUS. With red face, bill, and legs, white body, and the tips of the wings green: the white curlew of Cateby, and white ibis of Pennant and Latham. Found in the Bra- fils and in Carolina.

Fuscus. With red face, bill, and legs, brown body, beneath white: the brown curlew of Ibis, and brown ibis of Pennant and Latham. Found in the warmer parts of America, and in summer in Carolina.

Viridis. With black face and legs, green and cyanous wings, neck cinereous-black, beneath falcated with white, upper part of the body and tail green-golden, beneath and rump brown-blackish: the green ibis of Latham.

IGNeus. With black head and neck, green legs, body cyanous, reprefendent with green, beneath blackish-red, with the quills and tail-feathers green-golden: the glossy ibis of Latham.
LEUCOCEPHALUS. With white head, neck, and body, bill and face yellow, legs pale, and rump with very long rufous feathers: the white-headed ibis of Latham. Found in Ceylon.

CALYPS. With white head, the hinder part of the neck tuberculated, with the jugular bag bare, the crown, bill, and legs black, and body black: the bald ibis of Latham. Found in the western parts of Africa.

MANILLANNS. With the bill and orbit greenish, legs vermilion-coloured, and body red-brown: the Manilla ibis of Latham. Found in the island of Luzon.

CRISTATUS. With pale face, head, part of the neck, tail, and vent black, the crest on the hinder part of the head long with feathers partly white and partly black, ferruginous body, and whitish wings: the crested ibis of Latham. Found in Madagascar.

NICER. With face, bill, and legs red, and black body: the black ibis of Latham. Found in Egypt, near Damietta.

COCO. With face and bill yellow-fleshy, legs fleshy pale, body white, wings as far as the apex white, the three outer quill-feathers black above at the apex. Found in the Carriebean islands.

PILUS. With face, bill, and legs brown, body white, quill and tail-feathers black. Found near the rivers and lakes of Chili.

CAVYNNISS. With face obseurely reddish, obfuscere bill, body black and shining green: the Cayenne ibis of Latham.

MEXICANUS. With blueish bill, reddish face, head and neck obscure and white, a little varied with green and yellow, back, rump, and legs black, breast and abdomen brown, tail and quill-feathers brassy-green: the acalotl of Ray and Willughby, the acalotl of Buffon, and the Mexican ibis of Latham. Found near the lakes of New Spain.

MELEANOPI. With bill, face, and nails black, crown yellow, neck and breast yellowish, the feathers of the back, the scapulars, and tail-feathers, and pectoral band, cinerous, brown at the margin, the eyes and tail green and black, and the legs red: the black-faced ibis of Latham.

ALRIOUL. With black bill, head and neck rufous-white, body brown with grey waves and shining green, and red legs: the white-necked ibis of Latham. Found in Cayenne.

GRIESEUS. With spadiceous bill, face and nails black, hind part of the head and neck grey, body whitish, back, rump, quills, and tail greenish-black, and reddish legs: the grey ibis of Latham, and mutton of Willughby and Buffon. Found in Brazil.

TANTALUS's Cup, in Hydraulics, is a cup, as A (Pl. VIII. Hydraulics, fig. 6.) with a hole in the bottom, and the longer leg of the fihpon B C E D cemented into the hole; so that the end D of the shorter leg D E, may almost touch the bottom of the cup within. Then, if water be poured into this cup, it will rise in the shorter by its upward pressure, extruding the air before it through the longer leg; and when the cup is filled above the bend of the fihpon at F, the preffure of the water in the cup will force it over the bend of the fihpon; and it will defend in the longer leg C B G, and even through the bottom, until the cup be emptied. The legs of this fihpon are almost close together, and it is sometimes concealed by a small hollow statue, or figure of a man placed over it; the bend F being within the neck of the figure as high as the chin. So that poor thirsty Tantalus stands up to the chin in water, according to the fable, imagining it will rise a little higher, and he may drink; but, instead of that, when the water comes up to his chin, it immediately begins to defend, and therefore, as he cannot float to follow it, he is left as much tormented with thirst as ever.

TANTAMOUNT, something that amounts to, or is equivalent to, some other.

TANTANEH, in Geography, a mountain of Africa, which forms the south boundary of Berdoa.

TAN-TCHING, a town of Corea; 33 miles W.S.W. of Thon-tcheou.

TANTECO, a town of Mexico, in the province of Guatética; 25 miles N. of Panaue.

TAN-THOUL-TCHING, a town on the W. coast of the island of Formosa. N. lat. 25° 8'. E. long. 120° 49'.

TANTRA, the name of a branch of literature among the Hindoos, of which we have hitherto received but very imperfect information. The books bearing this title appear to contain directions for certain religious justices adopted by some sects and condemned by others. (See SAKTA.) The name Tantra, or Yantra, is also given to mysterious hieroglyphics, sacred to particular deities. See MANTRA, YANTRA, and PARUSHA.

TANTUM DECIES. See Decies.

TANTUMQUERI, in Geography, a town of Africa, in the country of Fantin, on the Gold Coast, with two forts, one belonging to the English, the other to the Dutch. N. lat. 5° 20'. W. long. 2° 54'.

TANTUR. See TONUBA.

TANUM, a town of Sweden, in Weft Gotland; 31 miles N.W. of Udddevalla.

TANUO, a town of Peru, in the archbishopric of Lima, and jurisdiction of Cagote.

TANURI, a town of Sweden, in the government of Bahu; 30 miles N.N.W. of Udddevalla.

TANUS, in Ancient Geography, a river of Greece, in the Peloponnesus, which had its source in mount Paros, traversed the Argolid, and discharged itself into the gulf of Thyreia.

TANXIPA, in Geography, a town of Mexico, in the province of Guatética, at the foot of a mountain; 70 miles N.N.W. of Panaue.

TANYGONG, a town of Hindooftan, in Berar; 36 miles W. of Nagpou.

TANZIPAO, a river of Louisiana, which runs into Pontchartrain lake, N. lat. 39° 18'. W. long. 90° 10'.

TANZU, a town of Africa, in Angola, near the coast; 20 miles S.W. of Lsando.

TANZY, in Botany, &c. See TANACETUM and TANNY.

TAOCE, in Ancient Geography, a town of Asia; in the interior of the Perfide, near the town of Orbeitas.—Also, a promontory of Asia, on the coast of the Perfide, 500 fladia from the mouth of the river Orotatis; and 700 fladia from that of the river Rhogomagus.

TAOCEANA, a country of Asia, in the Perfide.

TAOCHI, a people of Asia, in the mountains of Armenia.

TAO-LOU-SAC, or TA, in Geography, a town of Lower Canada. N. lat. 48° 5'. W. long. 69° 30'.

TAONABO, in Botany. See TANACETUM and TERNSTORIA.

TAONEROA, in Geography. See POVERTY BAY.

TAOO ISLAND, one of the Friendly islands, in the South Pacific ocean, about 24 miles in circumference.

TAOOK, a town of Cardiftan, situated in a barren country, N. of an extensive vale, which is about 20 miles over, and has a chain of mountains on each side, running E. and W.

TAORMINA, the ancient Tauromenium, a town of Sicily, in the valley of Demona, situated on the E. coast, on
on a narrow level above a precipice of mount Taurus, and
overhung by immense masses of rocks. According to
Swinburne it contains 3,000 inhabitants. It has been much
celebrated for its costly marble and excellent wine. The an-
cient Tauromenium was much more extensive than the pre-
ent town, and comprehended within its walls the town
of the promontory of St. Andrew, where was a theatre
placed between two high rocks, and commanding a full view
both of Ætna and of the plains. This theatre is reckoned
the most beautiful monument of antiquity extant. A con-
siderable portion of this building has escaped the ravages of
time, and affords the antiquary, as well as the architect, an
opportunity of examining that division of a theatre on which
the actors flood; a part that is wanting in almost all other
ruined theatres. The arcades are all composed of brick,
the rest of the walls of pebbles, and covered with caffings
of marble. The whole range of the vomitoria and galleries
that encircled the seats is yet standing as high from the
ground as the bottom of the second order; the propecurnum,
which formed the chond of the arch, is almost entire; it is a
thick wall, with a large opening in the centre, and three
niches; a small door, and a fourth niche on each side; be-
tween each of these apertures, or recesses, are marks in the
wall, where columns were placed. According to the plan
deduced from these ruins, the stage was a parallelogram of
138 feet by 58; on each side was a lofty square building,
consisting of a basement and two upper stories, from the
highest of which a communicating gallery was carried along
the back scena; the diameter of the semicircular part of
the theatre, where the audience sat, was 142 English feet.
The streets of the modern town, the courts and houses, are
every where interpenetrated with fragments of antique walls,
aquadrcs, and molicc pavements. The ascent to Taormina
is very steep and difficult; but the charms of the landscape
ample recompense the labour of attaining the height. Every
thing belonging to it is drawn in a large sublime style; the
mountains tower to the clouds; the castles and ruins rise on
weighty masses of perpendicular rock, and seem to defy the
attacks of mortal enemies; Ætna, with all its snowy and
woody sweeps, fills half the horizon; the sea is stretched out
upon an immense scale, and occupies the remainder of the
prospect. The beach is confined by high cliffs, which are ca-
cereous and consisting generally of a species of red and white
marble, which is in high esteem among the ancients. The
houses in the vicinity are inhabited by peasants, who occupy
them with their children and cattle. These several monu-
ments are undoubtedly coeval with the Romans; that is, po-
terior to Cezar, who, having expelled the inhabitants of
Taorumenium, placed in it a Roman colony. The origin
of this city is lost in the obscurity of ages. It is known
that it was considerably augmented, when Dionysius, in the
2d Olympiad, 443 years B.C., having taken and desroyed
Naxos, caused it to be deserted by its inhabitants, who settled
here. This proud city was at length destroyed by the Vene-
tians, and fortified by the Norman conquerors; and it still ex-
ists in a reduced state. When it was taken by the Saracens
from the Greek emperor in the 10th century, it was one of the
strongest places in the island, and called by them "Al
Mooezza," which name it retained for a considerable time;
27 miles S.S.W. of Melfina. N. lat. 37° 51'. E. long. 25° 23'.
TAOS LAPI, the peacock-shot, a name given by some
of the ancient writers to a very beautiful variegated agate,
resembling, in some degree, the great variety of colours in
the peacock's tail.
TAOSANLU, in Geography, a town of Asiatic Turkey,
in Natolia; 20 miles N.W. of Kiutaja.
called Tapawfi: he is much revered, and his prayers are earnestly solicited by the superstitious as needfully efficacious. (See Ravena.) Among his authorities he went through the following feries, each of the twelve specific mortifications enduring one hundred years.

1. He flood on one foot, holding the other and both hands up toward heaven, with his eyes fixed on the sun. 2. He flood on one great toe. 3. He took as fulnessen nothing but water. 4. He lived similarly on air. 5. He remained in the water. 6. He was buried in the earth, but continued, as in the other inflexions, in incessant adoration. 7. The fame in fire. 8. He flood on his head, with his feet upwards. 9. He flood on one hand. 10. He hung by his hands on a tree. 11. He hung on a tree with his head downwards.

Some of the Puranas, or books of divine authority, contain a feries of eighteen specific mortifications. One is now lying before us, and we give their denominations, with some explanatory observations.

1. Thales, is an elevation of the head, as the word denotes, during life: in this penance some devotees professed never to fit. 2. Akas-muni: this means ethereal contemplation: the aspirant in this case looks constantly on the heavens. 3. Med'ha-muni, indicates self-examination: the arms are usually crossed over the breast, and the penitent prefers a thoughtful posture or gait, with downcast looks. 4. Pherjia-babu, with arms projected horizontally. 5. Bhamm-pana, inversion; by suffocation on a tree, &c. head downwards, over a fire. 6. Patala-muni: this is the reverence of Akas-muni, meaning subterranean contemplation; Patala being the name of the lower regions, and Yama the lord thereof. The Patala-muni constantly looks downwards to the earth.

7. Muni, preferring continued silence in aid of abstraction. The world means a woman's mate, a sage, or saint, as well as wisdom and contemplation. We know of no difference between this species of devotion and that called Jop, which see. 8. Chaurapi-afin: the meaning of this compound word is eighty-four fitting positions; but it may have some other more mysterious and less obvious meaning. It would seem to be the reverence of some other penances, the merit of which confin in preferring one posture; whereas this implies an inconstant variation to the extent of eighty-four changes.

9. Kaffoli: the Areka or betel-nut penance. This consists in standing on their backs, the head reeling on the nut placed on the ground. This is done at stated times; but cannot, one would think, be continued. 10. Patani, the earthly or subterranean penance. This is described to be a partial burying of the body in the soil, the head downwards, and of course under ground, with the feet in the air, as in the air. One can scarcely see at first how this can be done; but probably the earth is placed very loyally about the head, &c. with the body or legs supported against a tree or wall. 11. Udjab-babu, with elevated hands, keeping them above the head. This is a common penance, perjured in sometimes till the arms become mere skin and bone, the fore-arms fixed immovably, croссng horizontally, and the finger-nails perhaps perforating the palms. A most eminent Udha-babu is described, with a portrait, in the fifth volume of the Asiatic Researches, art. ii. 12. Buiti, fitting posture, never rising or lying. 13. Nyat-d'hor, retaining the breath. To this practice great merit is ascribed, and it is perjured in to a very extraordinary extent; till at length no respiration is visible. In this state impollors pretend to beatific visions, and the credulous of course admire the wonders they relate. 14. Chaurangi-afin, a quadrupedal position, obtained by reeling on the elbows and knees, putting the hands backwards over the shoulders, and keeping

hold of the toes. This must be a very awkward and uneasy posture, and not obtainable without much practice. 15. Brahmi-basra: this is a stage of austerity much venerated, and easily practicable, at least occasionally. The devotee professes total indifference to every thing sublunary: he provides or asks for no food or clothing: he wanders or sits naked: if any one bring him food, he eats: his whole time, in short, is occupied in divine contemplation. 16. Panch-agni, five fires. The devotee sits on the ground, with a fire to the cardinal points, intempestie and near in proportion to his ability to bear them. The fire over head is the fifth fire. (See Panch-agni.) 17. Turangi, standing on one foot. This Lakshmi is related to have done for 100,000 years in the flower of the lotus, during one of her terrestrial incarnations, that the body might be reunited to her lord Vishnu. (See Payaka.) 18. Surya-carth, propitiating Surya, or the sun. This is done in various ways. Sometimes by abstaining merely till he is riven, or until other prescribed ceremonies have been performed. Fixing the eyes contemplatively on the sun is another mode. See Surya.

TAPASSANT, among Hunters, denotes lurking, or squatting. Hence also, to toppy, is to lie hid, as deer may do.

TAPATA-CASO, in Geography, a town of Thibet; 45 miles N.E. of Lassa.

TAPAUACA, a town of South America, in the province of Darien; 40 miles E.S.E. of St. Maria de Darien.

TAPAYAXIN, in Zoology, the name of a very remarkable species of lizard, called by Hernandez the lacertus orbicularis.

It is not of the long and slender shape of the common lizards, but as broad as it is long, and much resembling the ray-fish in shape, though seldom exceeding four inches in length or breadth. It is a cartilaginous lizard, of a very beautiful variety of colours, always very cold to the touch, and so sluggish a creature, that it often will not move out of its place even on touching it. Its head is exceedingly hard and elate, and has a foot of crown of prickles for its defence; yet it is a perfectly harmless animal, and so far from having the fear of man, and fynenets that other beasts have, that it loves to be taken up and played with, and will stand perfectly still, and seem very happy while played with. Hernandez, lib. ix. cap. 16.

TAPE-WORM, a species of worm breeding in the human bowels, and called by authors tentis, and hydrogen lotus, or the broad worm. See TANIA.

The Greek and Roman physicians, as well as those of our own time, have described those forms of worms to which the human bowels are subject. The common long worms, which resemble earth-worms; the acarides, or small worms; and this tape-worm, which they have also called vermis curvulatus, or the gourd-worm, from its resembling, in some degree, the seeds of that fruit. The interpreters of some of the Greek physicians have, however, been guilty of a great error, in confounding the gourd-worms and the acarides together, though nothing can be more unlike. The ancient seems to have had a very just opinion of this animal in calling it vermis curvulatus, since it is plain by this, that they understood every joint, as we call them, of this creature, to be a distinct worm; and what we call a single worm, to be a long series of these worms, joined together end to end.

The true history of this animal is, that it is short and broad. What is called a link of the long worm is really a distinct worm; and when one of these multiples in the bowels, its young adhere to it, and to each other endwise, so as to form a sort of chain, which lengthens as they con-
time to increase, and in fine becomes immediately long. Hence it is that the breaking, as it is called, of this worm, does not destroy it, and that the voiding large pieces of it is no cure, since it still recovers that length again by new young ones. Every separate link of such a chain, if examined, is found to be entire, lively, and brisk, and not at all injured by the separation.

Dr. Tyfon, in the Phil. Trans. No. 146, gives a curious account of this worm: it is always single; it lies variously convoluted, being sometimes as long as all the guts, and sometimes it very much exceeds that length. Olaus Borrichius assures us, that a patient of his, in a year's time, voided eight hundred feet in measure of this worm, though in that length he did not meet with the head; in voiding, the patient always observed it to break off.

Dr. Tyfon parallels this case with that of a patient of his, who discharged vast quantities of this worm for several years, but in various pieces, of two, three, four, five, or more yards long, but all put together, would (he says) much exceed the length of that of Borrichius.

The joint in this worm is very numerous. In one of twenty-four feet long, Dr. Tyfon numbered five hundred and seven joints. Above the middle of the edges of each joint, he observed a protuberant orifice. These orifices he takes for so many mouths; the best microscopes discovering no mouth in that part which usually pales for the head. This worm is common in most kinds of animals, as dogs, oxen, crabs, herrings, pikes, &c.

Some authors have asserted, that it is not one, but many worms linked together, and included in a spolium of the intestines; and that this spolium is not animated, but receives its sensation and motion from a sort of vermiculii curcubitini enclosed in it. This Galenus, de Lumb. Com. says, he has plainly discovered; but Dr. Tyfon abundantly convinces the contrary.

Authors who have treated of these worms as a disease, have given a canine appetite, or unnatural appetite to food, as one of the symptoms; but this is wrong, for it has never been found, in reality, that these worms, even where most numerous, have at all increased the natural appetite; and indeed it is very difficult to judge of their being in the body by symptoms, since they occasion none which are not also common in many other diseases. Many people have had them a long course of time, without being feebly hurt by them; and there has never been known an instance of their occasioning any one's death, or indeed any considerable disorder.

Fern-root has been long known as a remedy against worms. See Diæses of Infants, and Worms.

However, it was sunk into neglect till a few years ago, when it again came into notice, by being discovered to be the remedy which had become greatly celebrated in Switzerland as a specific in the cure of the tænia or tape-worm. The secret was purchased by the King of France, after its efficacy had been attested upon trial by some of the principal physicians at Paris.

The following has been published as the mode of its exhibition. After the patient has been prepared by an emollient clyster, and a fupper of panada with butter and salt, he is directed to take in bed in the morning a dose of two or three draughts of the powder of male fern-root. The dose to infants is only one draught. The powder must be washed down with a draught of water, but nothing else must be taken till two hours after, when a bolus of calomel, joined with some of the strongest cathartics, is to be given. If this does not operate, it must be followed by a dose of purging salts. By this method the worm is

commonly expelled in a few hours. If the trial does not succeed, the process must be repeated at due intervals.


TAPEANDURIAN, in Geography, a town on the E. coast of the island of Borneo. N. lat. 1° 24'. E. long. 117° 54'.

TAPEANTAN, a small island in the Sooloo Archipelago. N. lat. 6° 15'. E. long. 122° 9'.

TAPECON, in Ichthyology, a name given by fome to the fih generally called the uronocoetus, or far-gazer.

TAPEINIA, in Botany, a little plant of the Straits of Magellan, fo named by Commerfon, from vaxus, bundle, or low; vull. 59. This is the Ixia Pumila of Forster, Pl. Magell. 11. t. 2, referred by Wahl to Witsea. See that article.

TAPER, TAPERING, is understood of a piece of timber, or the like, when broad at one end, and gradually diminishing to the other; as is the cafe in pyramids, cones, &c.

To measure taper timber, &c. see SLIDING-Rule.

TAPER-Bored is applied to a piece of ordnance, when it is wider at the mouth than towards the breech.

Taper also denotes a kind of tall wax-candle, placed in a candlestick, and burnt at funeral processions, and in other church solemnities.

Tapers are made of different sizes; in some places, as Italy, &c. they are cylindrical; but in most other countries, as England, France, &c. they are conical or taper; whence possibly the name; unless we rather choose to derive taper in the adjective senfe from the substantive taper, in the Saxon tapen or tapon, cereum, wax-candle. Both kinds are pierced at bottom, for a pin in the candlestick to enter.

The use of lights in religious ceremonies is of a long standing; the ancients, we know, used flambeaux in their sacrifices, and particularly in the mysteries of Ceres; and they had tapers placed before the statues of their gods.

Some suppose that it was in imitation of this heathen ceremony, that lights were first introduced into the Christian church; others take it, that the Christians borrowed the practice from the Jews; but recourse need not be had to the one or the other. Doubtless, as in the first ages of Christianity, they had their meetings in obscure subterraneous vaults, there was a necessity for tapers, &c.; and there was even occasion for them after they had the liberty of building churches, those being contrived in such a manner as only to receive very little light, that they might inspire the greater awe and respect by the obscurity.

This original of tapers in churches is the most natural; but it is now a long time since the use of tapers, which necessity first introduced, is become a mere ceremony. St. Paulinus, who lived at the beginning of the fifth century, observes, that the Christians of his days were so fond of tapers, that they even painted them in their churches.

There are two ways of making tapers, the first with the ladle, the second by hand.

In the first, after the wicks (which are usually half cotton, half flax) have been well twisted, and cut of the due length, a dozen of them are hung, at equal distances, around an iron hoop, directly over a large copper basin full of melted wax.

Then taking an iron ladleful of the wax, they pour it gently over the wicks, a little below the tops of them, one after another; so that, the wax running down them, they become soaked and covered with it, and the surplus returns into the basin, under which is a pan of coals to keep it in fusion.

Thus they continue to call on more and more wax for ten
or twelve times, till the tapers be brought to the required dimensions. The first cast only foaks the wick, the second begins to cover it, and the rest give it the form and thickness; in order to which, they take care that every cast, after the fourth, be made lower and lower below the wicks to make them taper. The tapers, thus formed, are laid, while yet hot, one against another, in a feather-bed, folded double, to preserve them soft; and afterwards taken out thence, one after another, to be rolled on a long smooth table, with an oblong instrument of box, polished at the bottom, and furnished with a handle above.

The taper thus rolled and polished, a piece of its larger end is cut off, and a conical hole bored in it, with a boxen instrument, into which the pin or point of the candlestick is to be received.

While the broach is yet in the hole, they ufe to flamp the maker's name and the weight of the taper, with a boxen ruler, on which proper characters are cut. The taper is then hung up to harden, after which it is fit for ufe.

Making of Tapers by Hand.—The wicks being dipofed, as in the former manner, they begin to soften the wax, by working it in hot water, in a narrow, deep, copper vessel. They then take a quantity of this wax out with the hand, and apply it gradually on the wick, which is faftened to a hook in the wall, at the end oppofite to the collet; fo that they begin to form the taper by the large end, and proceed, till leffening the thicknefs to the neck or collet.

The reft is performed after the fame manner as in tapers made with the ladle, except that they do not lay them in the feather-bed, but roll them on the table as faft as they are formed.

Two things there are to be obferved in the two kinds of tapers; the first, that, in the whole procefs of tapers with the ladle, they ufe water to moisten the table, and other instruments ufed therein, that the wax may not flck; and that, in the other, they ufe oil of olives, or lard, for the fame end.

TAPER, Pafchal, among the Romans, is a large taper, on which the deacon applies five bits of frankincense, in holes made for the purpofe, in form of a crof; and which he lights with new fire in the ceremony of Easter-Saturday.

The Pontifical makes pope Zofimus the author of this ufe; but Baronis will have it more ancient; and quotes a hymn of Prudentius to prove it. That pope happened to have only eftablihcd the ufe of it in parih-churches, which till then had been refrained to greater churches.

F. Papbroch explains the original of the paflhal taper more diftinftly in his "Conatus Chronico-Historicus," &c. It feems that, though the council of Nice regulated the day on which Easter was to be celebrated, the patriarch of Alexandria was enjoined to make a yearly cafon of it, and to fend it to the pope. As all the other moveable feafs were to be regulated by that of Easter, a catalogue of them was made every year; and this was written on a taper, cerus, which was fed in the church with much folemnity.

This taper, according to the abbot Clafcellain, was not a wax-candle made to be burn; it had no wick, nor was it any thing more than a kind of column of wax, made on purpofe to write the lift of moveable feafs on; and which would fuffice to hold that lift for the space of a year.

For, among the ancients, when any thing was to be written to lift for ever, they engraved it on marble or lead; when it was to lift a long while, they wrote it on Egyptian paper; and when it was only to lift a short time, they contented themselves to write it on wax. In procefs of time, they came to write the moveable feafs on paper, but they filled faftened it to the paflhal taper; which practice was obferved for a long time at Notre Dame, in Rouen, and throughout the order of Cluni. Such is the original of the beneficence of the paflhal taper.

TAPER, in Ornithology, a species of swallow. See Hirundo.

TAPERA dos Bocas, in Geography, a town of Brasilia, in the government of Para, on the Guanapani; 90 miles S.W. of Para.

TAPURI, a town of Peru; 16 miles N.E. of Cochabamba.

TAPESTRY, or TAPISTRY, a curious kind of manufacture, serving to adorn a chamber, or other apartment, by hanging or lining the walls of it.

Some ufe tapestry as a general name for all kinds of hanging, whether woven or wrought with the needle; and whether filken, woolen, linen, leathern, or of paper, (in which they are countenanced by the etymology of the word, formed from the French tapisser, to line; of the Latin tappa, a cover of a wall or bed, &c.) But, in the common ufe of our language, the term is now appropriated to a kind of woven hangings of wool and silk, frequently railed and enriched with gold and silver, representing figures of men, animals, landscapes, &c.

The invention of tapestry seems to have come from the Levant; and what makes this the more probable is, that formerly, the workmen concerned in it were called, at leave in France, Sarazins, or Sarazimts.

Some have supposed that the English and Flemifh, who were the first that excelled in it, might bring the art with them from one of the croisades or expeditions against the Saracens. Accordingly they say, that those two nations were the first who set on foot this noble and rich manufacture in Europe, which afterwards became one of the finest ornaments of palaces and churches, &c. At leave, if they be not allowed the inventors, they have the honour of being the reftropers of this curious and admirable art, which gives a kind of life to wools and silks, in some respects not inferior to the paintings of the best masters. However, it does not appear at what precise era this manufacture was introduced into Europe; nor is it certain to whom it was owing.

Guicciardin, in his "Description and History of the Netherlands," printed at Antwerp in 1582, ascribes the invention of the art of making tapestry hangings to the Netherlanders, but he does not assign the time of the invention.

The art of weaving tapestry was brought to England by William Sheldon, &c. about the end of the reign of Henry VIII. See Dugdale's Warwickshire in State and Sheldon, p. 584.

In the reign of king James the first manufactures of tapestry were set up at Mortlake, in Surrey. Aubrey, indeed, in his history of that county, dates its institution in the subfquent reign; but Lloyd (State Worth, p. 953) is not only positive for the former era, but affirms, that at the motion of king James himself, who gave two thousand pounds towards the undertaking, Sir Francis Crane erected the house at Mortlake for the execution of the design; and this is confirmed by authentic evidence; for, in Rymer's Fædera, vol. xviii. p. 66, there is an acknowledgment from king Charles in the first year of his reign, viz. 1625, that he owes fix thousand pounds to Sir Francis Crane for tapestry; and he grants to him two thousand pounds yearly, for ten years, towards the maintenance of the said work.

Thefe works at Mortlake, which at first had been conducted after old patterns, were afterwards formed from designs,
TAPESTRY.

designed, both in history and grotesque, furnished by Francis Cleyn, and thus carried to singular perfection.

From the deed above recited, it is plain that the manufacture was then arrived at great perfection. See Mr. Walpole's Anecdotes of Painting in England, vol. ii. p. 36.

In the year 1661, a statute was enacted (cap. x.) for the encouragement of the linen and tapestry manufactures of England, and discouragement of the very great importation of foreign linen and tapestry.

The first establishment of a tapestry manufacture at Paris was under Henry IV., in the year 1666 or 1667, by means of several excellent artists, whom he invited from Flanders.

But this fell with the death of that prince. Under Louis XIV. the manufacture was retrieved by the care and address of the great M. Colbert, to whom is owing the establishment of the Gobelins, a royal tapestry manufacture, which has produced works of this kind scarcely inferior to the finest English or Flemish tapestry, either with regard to the design, the colours, or the strength.

In this manufacture both wool and silk are used, and sometimes gold and silver. The finest paintings may be copied in this work, and the greatest masters have been employed in draughts for the tapestry weavers.

The weavers of the Gobelins work behind, or on the wrong side of the loom, which stands upright, and the pattern is placed on either side of the workman.

As the tapestry of the Gobelins is made of pieces of a certain breadth only, there are other workmen, called rentrayeurs, or fine-drawers, who are employed in drawing or fine-drawing the several parts together, so that no seam is discernible, but the whole appears as one design, like a piece of silk from a loom. These workmen are also useful in mending and cleaning tapestry when damaged or pulled.

The tapestry-men distinguishing two kinds of work; viz. tapestry of the high and the low warp, though the difference is rather in the manner of working, than in the work itself, which is, in effect, the same in both, only the looms, and consequently the warps, are differently situated; those of the low warp being placed flat, and parallel to the horizon, and those, on the contrary, of the high warp, erected perpendicularly.

The French have had three considerable tapestry manufactories besides that of the Gobelins; the first at Aubusson, in Auvergne; the second at Felletin, in the Upper Marche; and the third at Beauvais; they were all equally established for the high and the low warp; but all laid aside the former, excepting that of the Gobelins.

There are admirable low warps in Flanders, generally exceeding those of France; the chief and almost only Flemish manufactories were at Brussels, Antwerp, Oudenard, Liége, Tourney, Bruges, and Valenciennes.

At Brussels and Antwerp they succeeded both in human figures and animals, and in landscapes; and that both with respect to the designing and the workmanship. At Oudenard their landscapes and animals were good, but their human figures not well executed. Liége, and the other cities named, came behind Oudenard. The French manufacture of Felletin has done tolerably well in landscapes, Aubusson in figures, and Beauvais in both.

The usual widths of tapestries were from two ells to three ells and a half, Paris measure.

The manufacture of tapestry of each kind (though less fashionable and in use than formerly) is too curious to be here part over without a short description. We shall give each under its separate article.

Manufacture of Tapestry of the High Warp.—The loom on which this is wrought is placed perpendicularly; it consists of four principal pieces; two long planks or checks of wood, and two thick rollers or beams. The planks are set upright, and the beams across, one at top, and the other at bottom, a foot distance from the ground. They have each their trunnions, by which they are fulfilled on the planks, and are turned with bars. In each roller is a groove, from one end to the other, capable of containing a long round piece of wood, fastened in it with hooks. Its use is to tie the ends of the warp to. The warp, which is a kind of worsted, or twisted woollen thread, is wound on the corroller; and the work, as fast as woven, is wound on the lower.

Within the planks, which are seven or eight feet high, fourteen or fifteen inches broad, and three or four thick, are holes pierced from top to bottom, in which are put thick pieces of iron, with hooks at one end, serving to sustain the coat-th Ave: the pieces of iron have also holes pierced in them, by putting a pin in which, the flke is drawn nearer, or set farther off; and thus the coats or threads are stretched and lengthened at pleasure. The coat-th Ave: is about three inches diameter, and runs all the length of the loom; on this are fixed the coats, or threads, which make the threads of the warp cross each other. It has much the same effect here as the spring-th Ave: and tredgles have in the common looms. The coats are little threads fastened to each thread of the warp, with a kind of folding-knot, which forms a sort of nash or ring. They serve to keep the warp open, for the passages of broaches wound with silk, woollens, or other materials used in the piece of tapestry.

Lastly, there is a number of little sticks, of different lengths, but all about an inch diameter, which the workman keeps by him in baskets, to serve to make the threads of the warp cross each other, by passing them across; and that the threads thus crossed may retain their proper situation, a packthread is run among the threads above the flke.

The loom thus formed, and mounted with its warp, the first thing the workman does, is to draw, on the threads of this warp, the principal lines and strokes of the design to be represented on the piece of tapestry; which is done by applying cartoons made from the painting he intends to copy, to the side that is to be the wrong side of the piece; and then with a black-lead pencil following and tracing out the contours of them on the thread of the right side; so that the strokes appear equally both before and behind. As to the original design the work is to be finished by, it is hung up behind the workman, and wound on a long staff, from which a piece is unrolled, from time to time, as the workman proceeds.

Besides the loom, &c. here described, there are three other principal instruments required for working the silk, or wool of the wool within the threads of the warp. These are a broach, a reed, and an iron needle.

The broach is of hard wood, seven or eight inches long, and two-thirds of an inch thick, ending in a point, with a little handle. It serves as a flute, the silks, woollens, gold, or silver, to be used in the work, being wound on it. The reed, or comb, is also of wood, eight or nine inches long, and an inch thick at the back; whence it usually grows lefs and lefs, to the extremity of the teeth, which are more or less apart, according to the greater or less degree of fine-ness of the intended work.

Lastly, the needle is in form of a common needle, only bigger and longer. Its use is to pref clove the wool and silks, when there is any line or colour that does not fit well.

All things being prepared for the work, and the work-man.
man ready to begin, he places himself on the wrong side of the piece, with his back towards the design; so that he works as it were, blindfold, seeing nothing of what he does; and being obliged to quit his place, and go to the other side of the loom, whenever he would view and examine the piece, to correct it with his dressing-needle.

To put any silk, &c. in the warp, he first turns and looks at his design; then taking a bunch full of the proper colour, he places it among the threads of the warp, which he brings across each other with his fingers, by means of the costs or threads fastened to the staff; this he repeats every time he is to change his colour.

The silk, or wool, being placed, he heats it with his reed, or comb; and when he has thus wrought in several rows over each other, he goes to see the effect they have, in order to reform the contours with his needle, if there be occasion.

As the work advances, they roll it up on the lower beam, and unroll as much warp, from the upper beam, as suffices them to continue the piece: the like they do of the design behind them. When the pieces are wide, several workmen may be employed at once.

We have but two things to add: the first, that this high-warp tapestry goes on much more slowly than the low-warps, and takes almost double the time and trouble. The second, that all the difference the eye can observe between the two kinds consists in this, that in the low warp there is a red fillet, about one-twelfth of an inch broad, running on each side from top to bottom; which is wanting in the high warp.

Manufacture of Tapestry of the Low Warp.—The loom, or frame, on which the low warp is wrought, is much like that of the weaver's. The principal parts of it are two strong pieces of wood forming the sides of the loom, and bearing a beam, or roller, at each end: they are fastened at bottom with other strong pieces of wood, in manner of trellices; and to keep them the firmer, they are likewise fastened to the floor with a kind of buttresses, which prevent any shaking, though there are sometimes four or five workmen leaning on the fore-beam at once.

The rollers have each their trunnions, by which they are fastened: they are turned by large iron pins three feet long. Along each beam runs a groove, in which is placed a staff, a piece of wood of about two inches diameter, and almost of the length of the roller; this piece fills the groove entirely, and is fastened in it, from space to space, by wooden pins. To the two staffs are fastened the two extremities of the warp, which is wound on the farther roller; and the work, as it advances, on the nearer.

Across the two sides, almost in the middle of the loom, passes a wooden bar, which sustains little pieces of wood, not unlike the beam of a balance: to these pieces are fastened flings, which bear certain spring-slaves, with which the workman, by means of two treddles, under the loom on which he sets his feet, gives a motion to the coats, and makes the threads of the warp rise and fall alternately. Each loom has more or fewer of these spring-slaves, and each staff more or fewer coats, as the tapestry consists of more or fewer threads.

The design or painting, the tapestry-man is to follow, is placed underneath the warp; where it is fastened from space to space, with flings, by means of which the design is brought nearer to the warp.

The loom being mounted, there are two instruments used in working of it: viz. the reed, and the flute. The flute does the office of the weaver's shuttle; it is made of an hard polished wood, three or four lines thick at the ends, and somewhat more in the middle, and three or four inches long. On it are wound the filks, or other matters, to be used as the wool of the tapestry. The comb or reed is of wood or ivory; it has usually teeth on both sides; it is about an inch thick in the middle, but diminishes each way to the extremity of the teeth; it serves to beat the threads of the warp close to each other, as fast as the workman has pulled and placed them with his flute among the threads of the warp.

The workman is seated on a bench before the loom, with his breast against the beam, only a cushion or pillow between them; and, in this posture, employing, with his fingers, the threads of the warp, that he may see the design underneath, and taking a flute, mounted with a proper colour, he paves it among the threads, after having raised or lowered them, by means of the treddles moving the spring-slaves and coats.

Lastly, To press and close the threads of the silk or yarn, &c. thus placed, he strikes each course (i.e. what the flute leaves in its passing and coming back again) with the reed.

What is very remarkable in the manufacture of the low warp, is, that it is all wrought on the wrong side; so that the workman cannot see the right side of his tapestry, till the piece is finished and taken out of the loom.

M. Le Blon, in endeavouring to fix the true harmony of colouring in painting, found that all visible objects may be represented by the three primitive colours, red, yellow, and blue; because out of these, all others, even black itself, may be compounded.

From the principle of producing any visible object with a small number of colours, and from observing the compounded colours which were reflected from two pieces of silk of different colours, placed one above another, he arrived at the skill of producing in the loom all that the art of painting required. In weaving, indeed, he hath been obliged to make use of white and black threads, besides red, yellow, and blue; and though he found that he was able to imitate any picture with these five colours, yet for cheapness and expedition, and to add a brightness where it was required, he found it more convenient to make use of several intermediate shades of colours.

In his new way of weaving tapestry in the loom with a draw-boy, it may be performed almost as expeditiously as fine brocades; for when the loom is once set and mounted, any common draught-weaver, unacquainted with drawing or painting, and indeed hardly knowing what figure he is about, may exactly produce what the painter hath represented in the original pattern: and thus a piece of tapestry may be woven in a month or two, which, in the common way of working, would take up several years; and what in the common way costs a thousand pounds, may, by this means, be afforded finer and better for a hundred.

The main secret of this consists in drawing the patterns, from which any common draught-weaver can mount the loom; and when that is done, the piece may be made of any size, by only widening the reeds and the warp; and a reverse may be made with the same ease: which is done by the boy's pulling the lashes up again in the same order in which he pulled them down before: by which contrivance the tapestry may be suited to any room, whether the light comes in on the right, or on the left. The patterns are painted upon paper, on which are printed squares from copper-plates, and these subdivided by as many lines as answer to the threads of the warp, which run lengthwise of the piece; then they try how many threads of the cloth answer to every subdivision of the squares. Every thread
of the warp goes through a small brafs ring called a *mule*, or through a loop in the loth, and hath a small long weight or lingee hung below, to counterbalance the backthreads, which going from the top of the rings or loops, are palled over the pulleys in the table directly over the loom, and are continued nearly in an horizontal position on one side of the loom to a convenient distance; where they are all spread on a cros piece fastened to two stables; these are called the *tail of the mouture*; and from each of these backthreads, just by the side of the loom, are fastened other backthreads, called *famplers*, which descends to the ground; so that by pulling these small cords, you raise any of the threads of the warp at pleasure; wherefore they fall a loop or pot-lar to as many of these small cords as there are threads of the warp to be pulled up at every shoot, or every throw of the shuttle; by which means the shuttle shows itself on the right side, where the warp is pulled up: and in ordering this, they are guided by the pattern, on which they count the distances of the subdivisions, which contain the same colours in the same line, and can be shot at once: then they fallen pot-lars to the several small cords that draw up the rings, through which tho' threads of the warp run, which are to be behind this colour; they tie all these loops together, and fallen a piece of worrid or silk to the knot, of the same colour that the workman is to throw; and the bands when he pulls each loop, names the colour, that the weaver may take the proper shuttle, and so on for every colour to be thrown. Phil. Trans. abr. vol. vi. p. 469. &c.

In connection with this subject, we are naturally led to give a brief account of the manufacture of carpets. This is said to have been introduced into France from Persia, in the reign of Henry IV., where it has been distinguished by extraordinary encouragement. The most considerable manufactory of this kind was that of Chailiot, or the royal manufactory of La Savoniere, or the Soap-house, about a league from Paris. This manufacture was altogether of wool, and worked in the manner of velvet. All sorts of figures of animals may be imitated in this work, but fruits and flowers answer best; and it is most successfully applied to the manufacture of carpets and all sorts of screens.

The carpets are, in some respects, wrought by the upright way of tapestry. The two rollers are placed the same way; the warp is braced from the top downward; the chain, with its loops, keeps all the threads of the warp equally perpendicular; the tick, which facilitates their crossing, runs through them in the same manner, and separates the foremost threads from the rest; the zipper-pole holds all the strings, which serve to draw the fore-threads in their turns, and then the opposite threads, in order to invent the spindles of wool. But the method of working in this manufactory differs from the upright way of tapestry in the following particulars.

The warp is divided, both before and behind, into parcels of ten threads, nine white and one blue; which is regularly continued through the whole width of the piece. The weaver works on the fore-side, and consequently sees what he does. The design or pattern is traced in its proper colours on cartons, tied about the workman, who looks at it every moment, because every tick is marked upon it, as it ought to be in his work. By this means he always knows what colours and shades he is to use, and how many tickes of the same colour. In this he is affiled by squares, into which the whole design is divided; each square is subdivided into ten vertical lines, corresponding with each parcel of ten threads of the warp; and besides, each square is ruled with ten horizontal lines, crossing the vertical lines at right angles. The workman having placed his spindles of thread near him, begins to work on the first horizontal line of one of the squares. These lines marked on the carton are not traced on the warp, for this would be endless; because an iron-wire, which is longer than the width of a parcel of ten threads, supplies the place of a crosf line. This wire is managed by a crook at one end, at the workman's right hand; towards the other end it is flattened into a fort of knife, with a back and edge, and grows wider to the point. The workman fixes his iron wire, or rod, horizontally on the warp, by twining some turns of a suitable thread of the web round it, which he palls forward and backward, behind a fore-throw of the warp, and then behind the opposite thread, drawing them in their turns by their leisures. Afterwards, if it be necessary, he brings his wool-thread round the wire, in order to begin again to thrust it into the warp. He continues in this manner to cover the iron rod or wire, and to fill up a line to the tenth thread of the warp, which is the blue one. He is at liberty either to stop here, or go on with the same crosf line in the next division. According as he palls the thread of the web round the iron wire, and into the warp, the threads of which he causes to cross one another at every instant; when he comes to the end of the line, he takes care to strike in, or close again all the tickes with an iron reed, whose teeth freely enter between the empty threads of the warp, and which is heavy enough to strike in the web he has used. This row of tickes is again closed and levelled, by a dree of blue thread doubled, which the workman puts into the warp, sliding his hand over the whole length of line he has wrought. He crosses the same tickes of the warp, and then stretches through them another single blue thread. He beats in these two tickes, one after another, with his reed; these drees of crosf tickes, which are a support to each line, will be hid by the pile on the fore-side, and they indeed diminish the beauty of the wrong side; but this is of no consequence. This done, the workman draws the iron rod or knife out of the loops of the web that covered it; and as it is wider towards its end, these loops refill its passage; but being edged at its fore part, it cuts them through. Then the workman with his left hand lays a strong pair of shears along the finished line, cuts off the loose hairs, and thus forms a row of tufts perfectly even, which, together with those before and after it, form the fag. One line of this sort comprehending the row of tickes and woollen pile, with the two blue threads which support them, somewhat furpaps in thicknes the space between the first and second crosf line of a square. By this means the workman always sees what he is doing. He follows, tick for tick and colour for colour, the plan of his pattern which he is at, and paints magnificently, without having the least notion of painting or drawing.

The manufacture of carpets, after the manner of Chailiot, was introduced into London in the year 1750, by two workmen who left the manufactory in disgust, and came here to procure employment. They were encouraged and furnished with materials by Mr. Moore, to whose affinity and zeal the establishment of this sort of manufacture has been principally owing. However, these men afterwards connected themselves with a Mr. Peter Parifot, who, under the patronage, and by means of the pecuniary assistance of his royal highness the duke of Cumberland, pursued the manufactory of a carpet already begun at Paddington. This undertaking was soon removed to Fulham, and, under the munificence of the duke, promised to be durable and advantageous. In 1752, Parifot, the undertaker, proposed a plan of publication, the nature of which it is now needful to recite; as the whole scheme, as far as he was concerned in it, soon came to nothing. But Mr. Moore, being pro-
vided with the necessary materials, and engaging proper workmen, and riling a very considerable expense, succeeded in establishing this important and useful manufacture, infomuch that, in 1757, he obtained a premium from the Society of Arts, &c. for the best carpet in imitation of the Turkey carpets; and by his ingenuity and perseverance in bringing this manufacture to perfection, it is now arrived at a very high degree of reputation.

Mr. Whitby and Mr. Paffavant were also honoured with premiums for carpets of their manufacture by the Society of Arts in 1757 and 1758. We have also manufactories for carpets that are much esteemed at Axminster and Wilton; not to mention those of Kidderminster and other places.

TAPETI, in Zoology, the name of an animal common in the West Indies, and called by some caniculus Americanus, the American rabbit. In the Linnean sytem, this animal is a species of hare, or lepus caniculatus. (See Lepus.) It has large ears like the common hare; a white ring round the neck, though some have not this ring; the face of a reddish colour; the chin white, the eyes black; colour of the body like that of the common hare, but darker; the body whitish, without a tail. These animals inhabit Brazil, live in woods, do not burrow, are very prolific, and afford good meat. The tapeti is found also in Mexico, where it is called cilli. Pennant.

TAPICUS LAPI, a name given by Pliny and the ancients to a species of griffes, or eagle-bone, found in a place of that name near Lucadica.

TAPHEUS, a word used by some writers to express any thing when depurated or purified to the greatest degree, as the salts, by repeated solutions and crystallizations, and the like. Peracelus uses it for a species of earth, the things produced from which, he says, never alter their nature by calcination or reverberation, or the like operations.

TAPHNI, in Ancient Geography, a town of Egypt, mentioned by the prophet Jeremiah, to which he and the Israielites that were with him retired.

TAPHRA, a town situated in the island of Corfica.

TAPHRUAS, or TAPHRA, a town of Africa Propria, upon the gulf of Numidia.

TAPHIUA, a town of Palestine, in the tribe of Juda. —Also, a town of Palestine, which belonged to the tribe of Ephraim, and was situated upon the frontier of that of Manassish.

TAPIA, in Botany, an American name, adopted by Pliny from Piso. See CRATEVA.

TAPIA, in Geography, a town of South America, in the kingdom of New Granada, and province of St. Martha.

TAPIAN POINT, a cape on the W. coast of Mindanao.

TAPIAUA, a town of Prufia, in Samland, on the Pregel; 20 miles E.S.E. of Konigberg. N. lat. 54° 36'. E. long. 21° 13'.

TAPICURU, a river of Brafi, which runs into the sea, S. lat. 12° 20'.

TA-P1-HOTUN, a town of Corea; 600 miles E. of Peking. N. lat. 40° 26'. E. long. 125° 22'.

TAPINOSIS, taxonomia, in Rhetoric, the name with diminution, which fee.

TAPION, L. in Geography, a town on the W. coast of Hispaniola; 10 miles E. of St. Marc.

TAPIR, or TAPIERETE of Maregrave, in Zoology, the name of an animal found in some parts of America, and called by the Portuguefe anta, by others danta, by Dampier vache montagnarde, and by others elan, and sua aquatinar, and in the tenth edition of the Linnean System, hipoapumas ter-

refiu. Gmelin makes it a distinct genus; and his generic characters, amended by Dr. Shaw, are as follows: front teeth in both jaws ten; canine teeth in both jaws single, incur-

vated; grinders in both jaws five on each side, very broad; feet with three hoofs, and a false hoof on the fore-feet. This animal (Tapir americanus) is of the size of a young calf, or beifer, and in that it somewhat approaching to the figure of the hog, and the back arched; its head is thicker than a hog's, and in a sharp ridge at top; and the male has a snout, or sort of probosces, hanging over the opening of the mouth, in which he has a very strong muscle, serving to retract it at pleasure; the nose of the female is defitute of the probosces, (this circumstance is doubled by Somanni,) and the jaws are of equal length; its eyes are small, and very like those of the hog; its ears roundish, bordered with white; and these he can draw forward at pleasure; its legs are thick, and not longer than those of our hogs; its fore-

hoofs are divided into three portions; and a sort of false hoof behind; but its hind-hoofs into three; its tail very small; the skin is hard and solid; and the hair short; and of a pale brown, and when young, variegated with white spots; and along the neck is a brilily mane, an inch and a half high. It lives in thick woods, on the eastern side of South America, from the illhumus of Darien to the river of the Amazons; and sleeps all day, but at night, or early in the morning, goes out for its prey: it feeds on vegetables, and is particularly fond of the stalks of the sugar-cane; it often takes the water, and swims excellently; the natives, in places where it is common, eat its flesh, which is said to be good: the Indians shoot it with poisoned arrows, and eat the skin into bucklers. This animal is a fahicious, slow-footed, and sluggish, and makes a kind of hissing noise; but perfectly harmless: the young are easily tamed, and may be rendered domestic, which is said to be the case in some parts of Guiana. When attacked by dogs, it makes a vigorous resistance. The tapir produces but one young at a birth, of which it is very care-

ful, leading it at an early age to the sea, and instructing it to swim. Ray and Pennant.

TAPIRIA, in Botany, Juff. 372, slightly altered from the bill more barbarous Tapiria, Abul. Guiana, 450° t. 188, which is itself an alteration of the Caribean name Tapiriri, by which this tree is known in Guiana. See JONQUILLA.

TAPIR-TAI, a town of China, in Geography, a town of Chinese Tartary. N. lat. 43° 15'. E. long. 120° 39'.

TAPIS. See TUNIC.

TAPIL, in Geography. See TAPILL.

TAPAKEN, a town of Prufia, in Samland, on the Pregel; 24 miles E. of Konigberg.

TAPLEY'S, a town of North Carolina; 12 miles N.E. of Hillborough.

TAPLINGS, in the English Salt-Works, the name given to certain bars of iron which support the bottom of the pan in which the brine is boiled.

These pans are very large, and cover a wide furnace; but as their width would make them apt to bend in the middle, which would spoil the working of the falt, there is a fort of wall of brick carried along the middle of the furnace, and on the top of this are placed these taplings: they are about eight inches high, and from four to fix in thicknesses, being smallest at the top. These are placed at about three feet distance one from another, and the wall which supports them, and which is called the mid-feather, is broad at the bafe, and so narrow at the top, as barely to give room for the bases of the taplings.

TAPOA-
TAP

TAPOAMANO, in Geography. See Sir Charles Saunders's Island.

TAPOANA, a river of Brasília, which runs into the sea, S. lat. 23° 10'.

TAPOCORO, a river of Brasília, which runs into the sea, S. lat. 25°.

TAPOGOMEA, in Botany, from the Caribbean name of one of the species, Tapogone; Aubl. Guian. 157. Juff. 208. See Callicocca.

TAPOOKAS, in Geography, a town of the state of Georgia, on the Yazoo. N. lat. 35° 57'. W. long. 89° 51'.

TAPOOL, a small island in the Soofoo Archipelago. N. lat. 2° 37'. E. long. 126° 52'.

TAPOOR, a town of Hindooftan, in the Myfore; 15 miles S.S.W. of Darampoory.—Allo, a river of Hindooftan, which runs into the Caunvery, 4 miles N. of Cavareipatam.

TAPOSIRIS, in Ancient Geography, a town of Egypt, at some distance from the sea, between Cynofigma and Patthana.—Allo, another town, called Parva Taposiris, on a tongue of land between the sea and the canal which passed from Canopus to Alexandria.

TAPPA, in Geography, one of the small Moleucca islands; separated by a narrow channel from Latalatta; on it is a pool of fresh water; a little to the north of the line. E. long. 127° 5'.

TAPPAHANOCK, a town of the United States of America, in Virginia, on a small river, which runs into the Rappahanock; 43 miles N.E. of Richmond. N. lat. 37° 58'. W. long. 76° 45'.

TAPPALANG, a town on the west coast of the island of Celebes. S. lat. 2° 25'. E. long. 119° 5'.

TAPPAN. See Orange-town.

TAPPANOLLY, a sea-port town of the island of Sumatra, situated on the west coast, in the country of Batta, on a small island called Punchongcachiee. The bay is very deep, capable of containing the united navies of Europe, and confining of a number of harbours within one another. The bay stretches into the heart of the Batta dominions, and its borders are inhabited by that people, who barter here the produce of their country for such articles as they want. The English East India company have a factory here. N. lat. 1° 40'. E. long. 98° 12'.

TAPPJI, or TAPI, called by the Moors Cheddar, a river of Hindooftan, which, as Thevenot says, has its source ten miles from the little town of Bremore, in the kingdom of the mountains of Deccan, and runs into the sea about 24 leagues below Surat. The Banians and Gentooes esteem this a very holy river.

TAPPING, the act of piercing a hole in a vessel, and applying a tube, or cannula, in the aperture, for the commodious drawing off the liquors contained therein.

TAPPING, in Agriculture, is the making an incision in the bark of a tree, and letting out the juice.

To tap a tree at the root, is to open it round about the root.

Ratray, the learned Scot, affirms, that he has found by experiment, that the liquor, which may be drawn from the birch-tree in the spring-time, is equal to the whole weight of the tree, branches, roots, and all together.

In the tapping of trees, the juice, taken in from the earth, ascends from the root; and, after it is concocted and assimilated in the branches, &c. it descends, like a liquor in an alembic, to the orifice or incision where it issues out.

One of the most effectual ways of tapping, so as to obtain the greatest quantity of sap in the shortest time, is not only to pierce the bark, or to cut the body of the tree almost to the pith, with a chisell (as some have directed), but to bore it quite through all the circles, on both sides of the pith, leaving only the outermost and the bark on the north-east side unpierced.

This hole is to be bored sloping upwards, as large as the largest auger will make; and that also through and under a large arm near the ground. So will it not need any stone to keep open the orifice, nor tap to direct the sap into the receiver.

By this method the tree will, in a short time, afford liquor enough for brewing; and with some of this sweet sap, one bushel of malt will make as good ale as four bushels of malt with ordinary water. The large maple, which we call the fycamore, is said to yield the best brewing sap, its juice being very sweet and wholesome. See Betula.

To preserve the Sap for Brewing.—Inflate it by a constant exposure to the sun in proper vessels, till the heat be gathered and ready, otherwise it will contract an acidity; when there is enough, put it into as much very thin cut and hard-toasted rye-bread, as will serve to ferment it; and when it works, take out the bread, and bottle up the liquor. A few cloves in each vessel that receives the sap, as it oozes from the tree, will also, certainly, preserve it a twelvemonth. See Dr. Tonge's Obs. in the Philosophical Transactions, No. 43; 44; 46; 68. or Abr. vol. ii. p. 673, &c.

TAPPING of Oaklings and other Trees, the practice of cutting off the tap-roots of young oaks and other trees or plants of that kind.

It has been noticed by Mr. Nicol, in his work on planting, that those who are in favour of this method, rather than that of fowling the seeds of these sorts of trees, suppose that tapping the downward roots of the young plants while they are in the nursery plantation, has the power and capability of making their roots ever afterward have a horizontal tendency in the earth or foil; that in consequence of it they are not liable to injury by infiltrating themselves downwards into bad foil; and that by a plentiful planting of nurting plants, to draw them upright, the necessity of heading them down is prevented. But that these are correct and solid arguments, he thinks, it is much to be questioned. No doubt, he supposes, exists that tapping is of infinite advantage to all tap-rooted plants of the tree kind, previous to their removal, since it causes them to put forth fibres on the upper part of the root, which they otherwise would not have done; fitting them thereby for being transplanted into shallow soils, and for seeking palturage for the sufficiency of the plants. But that the roots will, ever afterwards, have a horizontal tendency, may, it is believed, be fairly denied. Every plant, unless restrained, it is maintained, will follow its own natural inclinations and habits of growth. Nor can all the art of man prevent a downward tendency in the roots of these sorts of tree-plants, and at the same time allow them depth of soil. See Tap-Root.

TAPPING of Springs, the practice of boring through the surface covering materials of land with the auger, and letting off the hurtful water which is pent up, confined, and contained in the clayey bed or stratum below. See Spring-Drain.

TAPPING, a term applied to an operation which is sometimes performed on sheep for removing a diseased of the local droplical kind in the head. It is executed either by means of a very large pin, or a trocar made for the purpose. See Sturdy.

TAPPING, in Mechanics, a term applied to the making and rectifying of female ferews by means of a tap, i.e. a ferew prepared and referred for this purpose. The procès, which.
TAR

confidences of various manipulations, is minutely described in Nicholl's Journal, vol. i. p. 160—163. See Screw.

TAPPING, in Surgery. See Paracentesis.

TAPPONIS, in Geography, a town on the W. coast of Sumatra; 25 miles N. of Tapponooy.

TAPROBANE, or TAPROBANE, in Ancient Geography, a name anciently given to the island of Ceylon; which see.

TAPSAUN, a town in the interior of Africa, and one of those which were subjugated by Cornelius Balbus.

TAPSAUS, a river of Africa, which ran near the town of Ruficaca.

TAPSON, in Geography, a town of Thibet; 50 miles E. of Tchontori.

TAPUSIS, or TAPUSS, in Ancient Geography, a peninsula on the eastern coast of Sicily, between Hybla parva and Syracuse.—Alfo, a promontory of Africa, 12 leagues E. of the promontory Tritum. This formed the eastern extremity of the Sinus Numadicus.

TAPTEE, in Geography, a river of Hindoostan, formed by the union of several smaller rivers in the Candeift country, which runs into the gulf of Cambay, about 12 miles below Surat. See TAPI.

TAP-TOO. See Tat-too.

TAPULITAPERA, in Geography, a town of Brafit, on the coast; 15 miles N.W. of St. Luis de Maranon.

TAPURA, in Botany, an unexplained name of Aublet's. See Rohiia.

TAPUERA, in Ancient Geography, a town of Afla, in the mountains of Leffer Armenia.

TAPURI, or TAPYRI, a people of Afla, in Media.

TAPURI Montes, mountains of Scythia, on this side of mount Imaus. Ptolomy.

TAPUAS, in Geography, a river of Brafit, which runs into the river of the Amazons; the banks of which are inhabited by Indians, independent of the Portugeufes.

TAQUARI, a river of Brafit, having the largest of its many mouths in the Paraguay, in lat. 19° 15', and long. 54°

TAR. See Panlisco.

TAR, or Tarry, a thick dark-brown or black refrinous adhesive juice, issuing from the wood and bark of old pines or firs, either naturally, or by burning. See Pines.

Some modern writers inform us, that tar flows from the trunks of pines and firs, when they are very old, through incisions made in the bark near the root; that pitch is only tar inspissated; and both are the oil of the tree grown thick and black with age and the sun. The trees, like old men, being unable to periperse, and the secretive ducts obstructed, they are, as one may say, choked and fluided with their own juice. But the method used by our colonies in America of making tar and pitch, is, in effect, the same with that of the ancient Macedonians; as appears from the account given in the Philosophical Transactions. And the relation of Leo Africanus, who describes, as an eye-witness, making of tar on mount Atlas, agrees in substance with the methods used by the Macedonians of old, and the people of New England of this day. The greater part of the tar imported into Britain is brought from the Baltic, and is still prepared in nearly the same method which is described by Dioscorides as having been practised by the ancients. The branches of the trees are cut into billets, and piled up in large stacks, which are covered with turf. Fire is then applied to the wood, and it is suffered to burn with a flow mothered flame, during which process the tar is formed by the decomposition of the refrinous juice, which flows to the bottom, and runs out through a small channel cut for the purpose. The stacks are generally built on the slope of a hill, so that the tar is easily collected, and put into barrels; in which state it is brought into this country. The process now described is termed "distillation per defcentum." See Pine.

A more expedient and economical method of obtaining tar is practiced in France and Switzerland. The wood is heated in large brick ovens, constructed for the purpose, and thus it is charred more equally, and the tar is of a more uniform and better quality. In the Vallais the pines are felled in the preceding year, that the wood may be sufficiently dry, and when the outer bark and twigs are stripped, the remainder of the tree is cut into billets of tolerably equal size. The oven is constructed of stone or brick, of the shape of an egg placed on its small end: the floor is made either of a flat stone, flopped out into a hollow, or of several stones accurately joined together. On one side of it, about five inches above the lowest part, is a hole, in which a gun-barrel is thrust, and this serves to convey off the liquid tar that is collected. A large iron grate is laid at the bottom of the oven. The largest of these ovens are about ten feet high, and five or six feet in the largest diameter. In charging the oven, bundles of billets are thrown in and spread as evenly as possible, the interfaces being filled with chips, till the charge nearly reaches the top. The whole is then covered with a layer of chips, and the top of the furnace is closed with flat stones heaped upon one another, gradually levelling the opening, and forming a kind of vaulted chimney, the mouth of which is four or five inches across. The dry chips at the top of the furnace are then set on fire, and the heat spreads downwards, till the whole charge is sufficiently kindled. The chimney is then entirely closed with a large stone, and wet earth is heaped on the stones at top, and thrown on wherever the smoke is observed to burst out too strongly. The melting then begins, and the tar falls to the bottom, fills the hollow of the floor (which detains any bits of wood and other impurities), and runs off through the gun-barrel into casks placed for receiving it. The fire must be occasionally refreshed by letting in a small draught of air through small holes left for the purpose in the sides of the kiln. When the process is finished, the wood, completely charred, is taken out, and the oven, after having been cleared out, is again filled. The red wood and knots, being the richest in resins, are found to yield about one-fourth of their weight of tar; but the general average product is about 12 or 12 per cent. of the weight of the whole charge. After each process, a quantity of "lamp-black" is collected beneath the stones that form the vault of the temporary chimney.

According to Theophratus, not only the turpentine-trees, the pines, and the firs yield resin or tar, but also the cedars and palm-trees; and the words pix and rosin are taken by Pliny in so large a sense, as to include the exudations of the lentificus and cypresses, and the balsms of Arabia and Judea; all which perhaps are near of kin, and in their most useful qualities concur with common tar, especially the Norwegian, which is the most liquid and best for medicinal uses. Those trees that grow on mountains, exposed to the sun or north wind, are reckoned to produce the best and purest tar; and the Idaeus pines were distinguished from those growing on the plain as yielding a thinner, sweeter, and better secured tar. Every part of the tree, which is at all refrinous, is fit for yielding tar; but the red wood and the hard roots yield the best in quality as well as the greatest in quantity.

Every kind of wood will produce the prodigious acid (which see), and tar by the destructive distillation. Peat also will yield it in abundance.
TAR.

There is also a kind of tar, the project of making which was suggested by Becher, the celebrated chemist, in the time of King Charles II., which has for several years been prepared from coal in the bishopric of Liege, and in other parts of Germany: we also make considerable quantities in England, especially near Bredley, in Shropshire, and at Bristol. In the bishopric of Liege the coal is distilled in a kind of still, compounded of two large cast-iron pots. In England the coal is put into ovens, which are heated by fires lighted under their bottom, and the liquid matter is forced through an iron pipe inserted into the top of the oven, and which communicates with proper condensing vessels. Watson's Chem. Eff. vol. ii. p. 346, &c.

The earl of Dundonald, in Scotland, has lately invented the art of extracting tar and pitch from pit-coal, by a new process of distillation. See Address and Proposals by Sir John Dalrymple, 1784.

A substance resembling tar, called "brai-gras," and much used by the French for careening ships, is made in the following manner. The oven, described in the preceding part of this article, is charged with alternate layers of chips of green wood, and billets of dry, and all the refuse matter of turpentine, &c. Over the whole is laid a stratum of "brai-hee," or rosin, and the gun-barrel pipe is flopped up, and not tapped till the whole of the wood is reduced to charcoal. The vault of the oven is also covered more carefully after the charge is sufficiently kindled, and the whole process is carried on more slowly, and the heat of the fire melts the rosin at the top, which mixes with the refrains, and the whole concretes into a dark resinous liquid at the bottom. When it is sufficiently cooled, it is drawn off and barreled. This "brai-gras" is of an intermediate consistence between tar and rosin. Aikin's Diet.

Tar is properly an empyreumatic oil of turpentine, and has been much used as a medicine both internally and externally.

In substance, mixed with honey, has been found an excellent medicine for coughs.

The ancients esteemed tar good against poisons, ulcers, the bites of venomous creatures; also for phthisical, fero-lulous, paralytic, and athmatic persons. But the method of rendering it an inoffensive medicine, and agreeable to the stomach, by extracting its virtues in cold water, was unknown to them. Siris, fept. 9, 16, 17, 21, 28. See Tar-water, infra.

Tar is sometimes given in substance, mixed with fo much powdered liquorice, or other such powdery matter, as is sufficient to render it a fit consistence to be formed into pills. An ointment of tar has been directed in the pharmacopeias, which has been chiefly employed in cutaneous disorders. See Unguentum p. Pice.

Dr. Cullen mentions an empirical practice, with respect to tar, which is as follows. A leg of mutton is laid to roast, and whilst it is roasting it is basted with tar. Whilst the roasting is continued, a sharp scissor is frequently thrust into the substance of the mutton, so that the gravy may run out; with a mixture of the tar and gravy found in the dripping-pan, the body is to be anointed for three or four nights successively, and during the time the same linen is to be worn. This is alleged to be a remedy in several cases of lepra; and Dr. Cullen knew one instance of its having been employed in a lepra ichthyosis with great success, but he had no opportunities of repeating the practice.

But the chief use of tar is for paying the sides of ships and boats, and their rigging, in order to preserve them from the effects of the weather, which would otherwise crack or rot them.

The tar obtained from the deposition of pyroligneous acid has been recommended as the best preservative for every kind of wood-fence. For this purpose, it should be gently heated in an iron pot, and laid on with a brush. It foaks into the wood, and seems to leave no body, as the artist expresses it; but after some days' exposure to the sun, the surface and texture of the wood will be much altered; for it will be found to be impervious and hard, that it will be very difficult to make any impression upon it. If a second, and especially if a third coat of this tar be put upon wood, it will then bear out, as the painters call it, sufficiently well; and Mr. Parkes is of opinion that it will preserve all outside wood-work much more effectually than any other means that have hitherto been employed for the purpose. For ornamental paling, and all outside work, a first, and perhaps a second coat of this tar might be used with great advantage; and when these are dry, white lead and oil might be used to finish the work. This substance not only hardens the wood, but effectually preserves it from worms and from all other insects. It will stop the progress of decay, when wood has become worm-eaten. It is observed, however, that this tar is very different from that which is distilled from mineral coal, but which the earl of Dundonald recommended for a similar purpose. The appearance of the application may be very considerably improved by the following preparations; viz. 1 gallon of tar, 1 oz. of tallow, 2 oz. of pulverized rosin, melted together and put on warm; or 1 gallon of the tar and 2 oz. of pulverized sulphate of iron, used as the other. This tar has also been found an useful varnish for articles made of rolled iron, or of cast-iron. A beautiful varnish for these purposes may be formed by intimately mixing in a gentle heat one gallon of the wood-tar with half a pint of rectified spirits of wine. If this be laid on hot and properly hardened, it will prove a beautiful and durable black varnish. Parkes's Chem. Eff. vol. ii.

Tar may sometimes be found useful as an application for cuts in the eyeb by clipping, and also to the parts affected by the fly; and in those of many other forts of animals. It is likewise applied to the axles of wheel-carriages, in order to prevent friction, and might probably be still more beneficially made ufe of in this intention, by having a portion of black-lead incorporated with it, as it would last longer, and be, at the same time, more powerful in obviating the effects of friction.

It is a material which has also been recommended for being applied to the parts of trees from which boughs are taken; in which cases, the faces of the wounded parts and the edges of the bark are to be made perfectly smooth by means of a proper knife; and in a few hours afterwards, or as soon as the parts are become quite dry, they are to be carefully plaited over with the tar, which is similar to that employed for smear bow, or they may be laid over with white or blue lead paint, well mixed with oil, and made rather thicker than that commonly ufed in painting. The tar is, however, certainly preferable, being of a more adhering, healing nature; and, when laid on in a thin flate, is not so apt to fall off in a fealy manner by the action and effects of the weather, as is the case with the other substances.

As the component parts of vegetable tar have been found to consist of oil, refraneous matter, pyroligneous acid, and water; that which is of the finest brown colour, has the least acridity, and which is the freest from a dark black appearance, is probably the best and most proper for ufe in applications as dressings to animals; though the other kinds may be equally or more beneficial in different other intentions.

Tar, when in intimate mixture and union with butter or lard, and the different precipitates of mercury or sulphur,
forms an excellent application in different diseases of various kinds of animals, especially those of the skin.

**TAR. Barbados.** See Bitumen, and Petroleum Bar-
bados.

**TAR, Mineral.** See Bitumen.

**TAR-Water.** As the cold infusion of tar has been for-
merly much in vogue, and has been recommended by one of
the most learned and ingenious writers of the age, it may
not be improper to give some account of its virtues from
the bishop of Cloyne’s Sisir, or chain of reflections con-
cerning the virtues of tar-water.

In some parts of America, tar-water is made by putting a
quart of cold water to a quart of tar, and mixing them well
together in a vessel, which is left standing till the tar sinks
to the bottom. A glass of clear water being poured off for
a draught, is replaced by the same quantity of fresh water,
the vessel being shaken, and left to stand as before. And
this is repeated for every glass, so long as the tar continues
to impregnate the water sufficiently, which will appear by
the smell and taste.

But as this method produces tar-water of different degrees
of strength, the author says he chooses to make it in the
following manner: Pour a gallon of cold water on a quart
of tar, and stir and mix them thoroughly with a ladle or flat
flick, for the space of three or four minutes; after which
the vessel must stand eight-and-forty hours, that the tar may
have time to subside; when the clear water is to be poured
off, and kept for use, no more being made from the same tar,
which may still serve for common purposes.

This cold infusion of tar hath been used in some of our
colonies as a preservative or preparatory against the small-
pox, which foreign practice induced the bishop to try it in
his own neighbourhood, when the small-pox raged with great
violence. He says the trial fully answered his expectation;
all those within his knowledge, who took the tar-water,
having either escaped that distemper, or had it very favour-
able. Several were preferred from taking the small-pox by
the use of this liquor; others had it in the milder manner;
and others, that they might be able to take the infection,
were obliged to intermit drinking tar-water. He says, he
has found it may be drank with great safety and success for
any length of time, and this not only before, but also during
the aforesaid distemper.

The general rule for taking it is, about half a pint night
and morning, on an empty stomach, which quantity may be
varied according to the case and age of the patient; provided
it be always taken on an empty stomach, and about two hours
before or after a meal.

It has been found, that several persons infected with cuta-
aneous eruptions and ulcers were immediately relieved, and
soon after cured, by the use of this medicine. It is said, that
even in the most distempered, it proved much more success-
ful than salines and wood-drinks had done. It also suc-
cceeded, beyond expectation, in a tedious and painful ulcer-
ation of the bowels, in a consumptive cough, and (as ap-
peared by expectorated pus) an ulcer in the lungs, in a
pleurisy and perniency. And when a person had
been for some years subject to erysipelas, perceived the
usual forerunning symptoms to come on, the drinking of
tar-water prevented the erysipelas.

Tar-water cures indigestion, and gives a good appetite.
It is an excellent medicine in an asthma; it imparts a kindly
warmth, and quick circulation to the juices, without heat-
ing, and is therefore useful, not only as a peculiar and bal-
famic, but also as a powerful and a safe debulcitrant in ca-
chezetic and hysterical cures. As it is both healing and diu-
retic, it is very good for the gravel. The bishop says he
believes it to be of great use in a dropy, having known it
cure a very bad anasarca in a peron whole third, though
very extraordinary, was in a short time removed by the
drinking of tar-water. From the success of this medicine in
five or six instances, the bishop believes it to be the heat and
safety, either for preventing the gotit, or for strengthening
nature against the fit, as to drive it from the vitals.

It may likewise be safely used in inflammatory cases; and,
in fact, hath been found an admirable febrifuge, at once the
safety cooler and cordial.

The farts and more active spirits of the air are got by infusion
in cold water; but the reposing part is not to be dissolved
thereby. Hence the prejudice which fome, perhaps, may
entertain against tar-water, the use of which might inflame
the blood by its sulphur and resin, as a medicine, appears
not to be well grounded. It is observed by chemists, that
all sorts of balmatic wood afford an acid spirit, which is
the volatile oily part of the vegetable. Herein is chiefly
contained their medicinal virtues; and this author affirms,
that by the trials he has made, it appears that the acid spirit in
tar-water posifles the virtues, in an eminent degree, of that
of guaiacum, and other medicinal woods.

It is certain tar-water warms, and therefore some may per-
haps still think it cannot cool. The more effectually to
remove this prejudice, let it be further considered, that, as
on one hand, opposite caufes do sometimes produce the fame
effect; for instance, heat by rarefaction, and cold by con-
densation, do both increafe the air’s elasticity; fo, on the
other hand, the fame cauè shall sometimes produce opposite
effects. Heat, for instance, in one degree thins, in another
coagulates, the blood. It is not therefore strange, that tar-
water should warm one habit and cool another; have one
good effect on a cold constitution, and another good effect
on an inflamed one; nor, if this be fo, that it should cure
opposite disorders.

A medicine of fo great virtue in fo many different dis-
orders, and especially in that grand enemy the fever, muft
needs be a benefit to mankind in general. There are never-
theless three forts of people to whom the bishop fays he
would peculiarly recommend it; sea-faring perfon, ladies,
and men of studious and fedentary lives. See Two Letters
from the Bishop of Cloyne, &c. published in 1747.

If it be asked, what precise quantity, or degree of strength,
is required in tar-water? It is anfwered, that the palate,
the fomach, the particular cafe and constitution of the pa-
tient, the very feafon of the year, will difpofe and require
him to drink more or lefs in quantity, stronger or weaker in
degree. Precisely to measure its strength by a ferupulous
exactness, is by no means necffary.

It is to be obferved, that tar-water fhould not be made in
unglazed earthen veffels, thefe being apt to communicate a
nauseous fweetnefs to the water.

The fame ingenious author recommends tar-water in the
plague, and for the distemper among the horned cattle; with
what fuccefs, muft be left to experience.

Though this medicine, fays Dr. Lewis, is undoubtedy
very far inferior to the character that hath been given of it,
it is apparently capable of anfwering important purpofes,
as a debulcitrant balmatic folution, moderately warm and
stimulating. It feebly raifes the pulse, and increafes either
perpiération or the grofter evacuations. He adds, “I have
been informed of fome late inflances of its good effets in
disorders of the leprous kind.” Mat. Med.

Dr. Cullen thinks that the acid principle gives the virtue
to tar-water, and on this account the bishop of Cloyne pro-
perly preferred the Norway tar to that of New England,
as the former contains more acid than the latter. This eminent
physician

Vol. XXXV.
physician acknowledges that he found this preparation in
several cafes to be a valuable medicine; and that it appeared
to strengthen the tone of theRomach, to excite appetite, to
promote digestion, and to cure all symptoms of dyspepsia.
At the same time, it manifestly promotes the excretions,
particularly that of urine. From all these operations, it will
be obvious, as the doctor thinks, that in many disorders of
the kidney this medicine may be highly useful. Lewis. Wood-
ville.

It has been long observed by Dr. Darwin, that the wa-
tering of ground with tar-water is capable of destroying the
white flag, which is so highly destructive to vegetables.

TAR-Kettle, in Rope-Making, is made of copper, and holds
from ten to twenty barrels of tar. It is set in strong brick-work,
and over it is fastened, from side to side, in the direction of the
nipple, a bridge, made of three-inch oak-plates, thirteen inches
broad, through the middle of which is a mortar for the steps
to go through, to keep the yarn down and clear of the bottom,
when drawing through the kettle. On the side of the kettle
next to the capstern, is an upright post, twelve inches
tall, in which is fixed a nipper to press the tar out of the
yarn; and a flax, with a weight suspended at the end, is
fixed on the side of the nipper to keep it down, that the yarn
may imbibe no more tar than is necessary.

TAR-Opes, a term used to signify tarred rope, or rope-
yarn, such as the thread of old cables, &c. This sort of tar-
rope is useful for a great number of different purposes, such
as those of tying up the wads or sheaves of beans in the field,
and many other similar articles; the fastening of plants and
trees to various kinds of supports; and for being applied to
a variety of other little uses of the more domestic kind, as
being cheap and readily procured.

TAR, in Commerce, a small silver coin on the coast of
Malabar.

TAR, in Sea Language, a figurative expression for a sail-
or of any kind.

TARA, in Geography, a town of Russia, in the govern-
ment of Tobolsk, on the Irtysh; 220 miles E.S.E. of
Tobolsk. N. lat. 57°; E. long. 74° 43'.—Alfo, a town
of Japan, in the island of Xioco; 28 miles N.N.E. of
Ouviö.

TAR Hill, a mountain of Ireland, in the county of
Wexford, near the sea-coast; 4 miles N. of Newborough.
See TARAGH.

TARA, the name of a Samian hero renowned in the
Hindoo epic the Ramayana, for mighty deeds in battle with
the hosts of the tyrant Ravana, for the recovery of Sita, the
ravished spouse of Rama.

TARAN, in Geography, a town of Grand Bucharia;
50 miles E. of Samarcand.

TARABAD, a town of Hindoostan, in Baglana; 13
miles E. of Saler Mooler.

TARABE, in Ornithology, the name of a Brazilian parrot,
larger than the common green parrot. Its general colour is
green; but its head, breast, and the origin of its wings, are
red; its beak and legs are of a dusky grey. Maregraave.
See Phitacæus.

TARACASSA, in Geography, a district of South
America, in the vicereignty of Buenos Ayres, part of the
jurisdiction of Carangas.

TARAE LAPIS, the name given by the writers of the
middle ages to a stone which they say had the power of
flopping all forts of fluxes. They have left us no descrip-
tion of it, and it seems to have been lost even in their times;
for they observe that the physicians used the fanguis draconis,
or dragon’s-blood, in its place.

TARAGH, in Geography, a small town or rather village
of the county of Meath, Ireland, on the noted hill of Taragh;
where the states of Ireland are said to have assembled, and
where some pretend that there was a magnificent palace
belonging to the kings of Ireland; but as no trace of any
such palace is to be found, its having existed must be re-
garded as improbable. General Vallancey accounted for
there being no trace of it, by supposing it to have been
made of mud and straw. A Danish invader is also suppos-
ed to have taken up his abode here, and to have built the fine
Danish fort, or rath, on the south-east side of the hill, which
is now beautifully planted. It is 5 miles N. by W. from
Dunhafflagh, and 19 miles from Dublin, on the road to
Cavan. There are two other hills of the same name, one in
the county of Down, and the other in the county of Wex-
ford, both of them near the sea.

TARAGOT, or Taragale, a town of Africa, in the
province of Darah; 130 miles S.E. of Morocco.

TARAGUICO AyCURABA, in Zoology, the Brazilian
name for a species of lizard, much approaching to the nature
of the taraguira; but its tail is covered from its beginning
with small triangular scales, and very regularly marked with
four brown spots; the back also, particularly that part
which is next the head, is variegated with undulated brown
lines.

TARAGUIRA, the name of an American lizard. It
grows to about a foot long; its body is rounded, and every
where covered with small triangular dusky grey scales; its
back is smooth, and it has not that lalce gullet under the
throat which the ignana has.

This is the species of lizard of which it is reported, that
it will awake a sleeping person, if it see him in danger of
being bitten by a serpent. It is very common about bouses
and gardens in South America, and runs very swiftly,
but with a waddling motion; and when it sees anything
at a distance, has an odd way of nodding its head very
swiftly. Ray.

TARACUPALA, in Geography, a town of Hindoostan,
in Tellangana; 25 miles N.W. of Warangole.

TARAKLI, a town of European Turkey, in Baths-
rabia; 24 miles S.W. of Bender.

TARALEA, in Botany, a barbarous name of Aublet's.
See Dipteryx, species 2d.

TARAM, in Geography, a jurisdiction of Peru, in the
audience of Lima. The air is healthy, and the soil fertile.

TARAMAMON, a name given by Loubere to a ridge of
mountains that passes E. and W. in Siam, not far to the
north of Yuthia.

TARAMANDAHU, a river of Brazil, which runs into
the Atlantic, S. lat. 30° 40'.

TAREMEH, A, a town of Egypt, in ruins; 2 miles
N.E. of Tineh.

TARAMUNDE, a town of Spain, in Afturia; 45
miles W. of Oviedo.

TARANCON, a town of Spain, in New Castile; 33
miles S.E. of Madrid.

TARANDUS, in Entomology, a species of Lucanus;
which fea.

TARANDUS, in Zoology, a name given by Agricola, and
some other authors, to the rein-deer. See Cervus Tar-
andus.

TARIANOLO, in Ornithology, a name by which the
whimbrel, or small curlew, called the aquata minor by
authors, is known in the markets of Italy.

TARANIS, probably from tara, thunder, in Ancient
Mythology, a name given by the Gauls to Jupiter, under
which appellation they sacrificed human victims to him.
TAR

Taranis corresponded to the Jupiter Tonans of the Romans. See Triton.

TARANNON, in Geography, a river of North Wales, which runs into the Severn; 4 miles W. of Newtown in Montgomeryshire.

TARANSA, one of the Western islands of Scotland, about four miles in length, and two in breadth, where widest, but in some places scarcely half a mile across; 5 miles N.E. from Toe-Head. N. lat. 59° 52'. W. long. 6° 50'.

TARANTA, the name of mountains of Abyllinia, that lie on the east of the kingdom.

TARANTARA, according to Ennius, the military trumpet's flourish of the Romans.

TARANTELLA, a rapid tune played to perfons in Calabria, suppos'd to be bitten by the tarantula, in order to excite them to dance, which has been thought, while the disease was believed, to be the only specific.

TARANTISME, in Medicine, the disease or affection of those bit by the tarantula.

The patients under this malady are denominated tarantati.

Dr. Corenio, in the Philosophical Transactions, represents this as an imaginary disease; and tells us, that the tarantati, or those that think themselves feized with it, (excepting such as for particular ends feign themselves so,) are most of them young wanton girls, such as the Italian writers call Donne di falo, who, falling from some particular indisposition, into melancholy madness, perfuade themselves, according to vulgar prejudice, that they have been bitten by a tarantula.

But the evidence, on the other side of the question, has gained considerable credit, as will appear from the article TARANTULA.

TARANTOLA, in Geography, a town of Naples, in Aburzo Citra; 10 miles E.E. of Salmona.

TARANTULA, or Tarentula, in Natural History, a venomous insect, whose bite gives name to a new disease, called tarentussus.

The tarantula is a kind of spider, the aranea tarantula of Linneus, so denominated from the city of Tarentum, in Apulia, near which it is chiefly found. It is also called phalangium Apulium. Valetta, a monk of Apulia, who had always resided about the places where this mischievous animal is most frequent, and had many opportunities of tracing its several qualities, published a fuccinct, but very accurate history of it in the year 1706, under this name.

It has its name phalangium, from the three phalanges or joints of its legs, and this name equally suits many other spiders; as well as this, it ceased to be its appropriated name; and was applied as a generical term to several other spiders of the larger kind, among which this species was always distinguished by the epithet Apulium, from the place where it was so frequently found.

The tarantula, or Apulian phalangium, is frequent in all parts of this country, in uncultivated places, but more especially it breeds most in sunny dry hills, and particularly in such parts of them as are exposed to the south.

It is said not to be found any where except in Apulia, but probably it is an inhabitant of many other places, though its poison may not be violent enough any where else to bring on the effects it does there; as we find in vipers and many other poisonous creatures, that the strength of their poison differs greatly in degree in different places.

M. Geoffroy says, that it is the opinion of some that the tarantula is never venomous but in the coupling season; and Baglivi says, that it is never so but in the heat of summer; particularly in the dog-days, when, becoming enraged, it sits on all that pas by.

As this spider is very tender, and easily injured by cold winds and rain, it always digs itself a cave in the side of a hill for its habitation; and usually chooses for this purpose the hardest ground it can find, which is better able to defend it, and which it easily works into, with its forceps and claws. This always is hollowed upward in the hill, and by that means is safe from wet, all the water in rainy seasoons running down over its top. Sometimes it burrows itself a cave in a valley or plain, but then it always chooses a dry, usually a chalky soil. In this cave, the entrance into its cave is small, and within, there are several winding passagés: if it happens to be surpriz'd with wet in this place, from hard rains, it quits the floor and hangs by its feet against the top of the cave. It preys upon a number of small insects, with which the fields of Apulia abound, and seldom appears in the day-time, but creeps out about the time of sun-set, and preys at large upon the animals which are then betaking themselves to rest; without the danger it would be expose'd to from its own enemies by day-light.

If at any time he remains the whole evening in his cave or den, it is only to practice another method of hunting his prey. In this cave, he comes forward to the mouth of the hole, and there lies in wait; his fore-legs are placed at the extremity of the hole, and his eyes have a clear view all round. The other insects are not aware of this trick, but as they walk near his hole he bursts out upon them, and seizing them, he convey's them into his habitation, where, as soon as he has eaten them, he retires back into his cell to dispose of the wings and other fragments, till he can carry them out at a more convenient time, and then places himself in his former posture for another prey.

The peasants of Apulia have a method of getting him out of his hole in the day-time, in order to destroy him. This they do by making a soft hissing noise through an oxtrow: whether it be that the creature loves this sound, or rather that he takes it for the voice of some insect that he is used to prey upon, he always comes out, and falls a sacrifice to his greediness.

The creature has eight legs, and walks very well; his legs have each three joints, and are covered with a fine downy hairiness; they are of a whitish colour at the bottom, and variegated with black lines, and are wholly black in their upper parts, where they are joined to the breast; these are aride from a kind of oval shield, which is placed upon the breast, and is black, hairy, and very hard: this is called by some the speculum of the tarantula. From the shoulders there grow a pair of horns, at least they are usually called so, though they seem much better to deserve the name of arms; the use of these is to hold fast the prey, that it may not be able to escape while he is killing it with his forceps: these horns or arms have the same number of joints that the legs have, but they greatly differ from the legs, in that they are shorter, and of a yellowish colour; they are also covered with a longer and thicker hair, for the more certainly holding the prey, and are terminated by black claws, and they are much smaller, and more capable of motion every way.

The belly is either white, or of a pale yellow, and is marked with a transverse black stripe: this is surround'd with several other small spots of the fame colour, and is clothed with a very fine and short down; the whole body before is covered with longer hairs, and is of a whitish or brownish colour; the apex of the head, the shield of the breast, and the ends of the forceps, are as hard as a crab's claws; but the rest of the body is covered with a tender supple skin: the eyes are

OZ
very
very large, and of a fine shining black; they are continually
in motion, and, when seen in the night, or in a dusky place,
they shine like the eyes of a cat. In the place where the
mouth is placed in other animals, there arises in this a black
hard forceps; the upper part of this instrument is covered
with a yellow hairiness, and it is terminated by extremely fine
and sharp claws, which the creature can open or close up at
pleasure. While the arms hold the prey in a proper posi-
tion, these sharp points make wounds in the body, and the
other parts of the forceps squeeze the body till all its juices
are pressed out, and the creature feeds on them; the mouth
is placed much below these, and it acts exactly in the proper
place to receive the juices expressed by this operation. The
tarantula feeds in his cave the whole winter, and a great
part of the autumn and spring; and if during this time he
is ploughed up, as is often the case, or is in any other way
taken out of his hole, he is found quite torpid and numbed,
and is unable to do any mischief by biting.

The hole or mouth of a tarantula's cave always gives
some idea of the size of the creature within: he makes it
small if he enters it while young; and as he grows larger,
he eats away more and more of the earth to widen it still
more, so that the diameter of it is usually about equal to
the diameter of the body. The size of a chef'naut is about
the standard of a full-grown tarantula; but there are some
old ones found much larger and more hairy. The female
is known from the male by having longer legs and a larger
belly. They copulate in June and July, and at that season
the females are often met with in the fields carrying the
males upon their backs. In August and September they lay
their eggs, which remain the whole winter; and in the sum-
mer after are hatched.

Pliny tells a story of the young ones always eating up
their mother for the first food, which is countenanced by
the relation of the peasants in those parts, who say that they
all swarm about her and suck her juices from many places at
once, till they leave her a lifeless carcass on the field, and
then go each in their several ways in search of other food. The
bite of the tarantula, as it is called is not properly a bite,
but a wound inflicted in a very peculiar manner. The crea-
ture pierces the skin with its forceps, and at that instant in-
jects from its mouth a poison into the wound. The time in
which their wounds are fatal, is that of their copulation; at
this time they are in their utmost vigour and power of hurt-
ing. People of fashion are rarely hurt by them, but prin-
cipally the poor labourers, who sleep half naked in the field,
and the women who travel the country with naked feet, ga-
tering medicinal herbs.

The bite occasions a pain, which at first seems much like
that felt on the stinging of a bee, or an ant; in a few hours
the patient feels a numbness, and the part affected becomes
marked with a little livid circle, which soon after rifes into
a very painful tumour; a little after this it falls into a pro-
found dizziness, breathes with much difficulty, his pulse grows
feeble, and his senses fail; at length he loses all sense and
motion; and dies, unless relieved. But these symptoms
come somewhat differently, according to the nature of the
tarantula, and the disposition of the patient. An aversion
for black and blue; and, on the contrary, an affection for
white, red, and green; are other of the unaccountable symp-
toms of this disease.

All the afflilation medicine has been able to discover by
reasoning, consists in some surgical applications on the
wound, and in cordials and sudorifics; but these are of little
efficacy: a thing that avails infinitely more, is, what reason
would never have discovered—music.

As soon as the patient has lost his sense and motion, a
musician tries severalf tunes on an instrument; and when he
has hit on that, the tones and modulations of which agree
with the patient, he is immediately seen to make a faint mo-
tion: his fingers first begin to move in cadence, then his
arms, then his legs, by degrees his whole body; at length
he rises on his feet, and begins to dance; his strength and
activity still increasing. Some will continue the dance for
six hours without intermission.

After this he is put to bed, and when he is judged suffi-
ciently recovered from his first dance, he is called out of bed,
by the same tune, for a second.

This exercise is continued for several days, six or seven at
least; in which time the patient finds himself exceedingly
fatigued, and unable to dance any longer; which is the char-
acteristic of his being cured; for as long as the poison acts
on him, he would dance, if one pleased, without any dis-
continuance, till he died of the mere loss of strength.

The patient, on this, perceiving himself weary, begins
to come to himself; and awakes as out of a profound sleep;
without any remembrance of what had paffed in his pa-
roxysem, not even of his dance.

Sometimes the patient, thus recovering from his first ac-
cept, is quite cured; if he be not, he finds a melancholy
gloom hanging on him; he flumes the sight of men, and
seeks water; and, if he be not carefully looked to, throws
himself into some river. If he do not die, the fit returns
at that time twelve months, and he is driven to dancing again.
Some have had returns regularly for twenty or thirty years.

Every tarantula has his particular and specific tune; but,
in the general, they are all very brief, sprightly ones, that
work cures.

This account was given in the Royal Academy of Sciences,
by M. Geoffroy, at his return from Italy, in 1702, and
confirmed by letters from F. Gouye. The like history is
given by Baglivi, in an express dissertation on the tarantula,
published in 1696.

Authors are divided about the nature of the poison of
the tarantula. Cardan says it is a cold one, and Scaliger
says it is a hot one; but, be this as it will, Valetta informs
us, that its effect is very sudden; it is no sooner received
into the flesh, but the veins take it up and carry it to the
heart, where it becomes diffused through the whole mafs of
blood, and gives an immediate trembling of the limbs, and
a difficulty of breathing. The next part it feizes is the
brain, where it produces different effects in different sub-
jects; and, according to their state of health, and the con-
dition of their juices, brings on various species of phrenesi-
es. The patient sees a thousand phantoms, sometimes all joi-
val and merry ones, and sometimes imaginary scenes of blood
and cruelty. Some are fond of seeing little streams of wa-
ter trickling down into a bason; others are never easy un-
less they have green leaves before them; this indeed is almost
an universal symptom. Some are delighted with various
colours, and some are fond of violent motion, such as danc-
ing, leaping, and the like; and some are in love with flow
and graceful movements, as walking majestically, bowing,
and dancing slow dances. Some are military mad, and call
out for the noise of drums and trumpets, and the clashing
of swords; but all of them, as well the brilk and noisy, as
the lethargic and dull, are pleased with music.

They will get up and dance to any instrument; and the
moment it ceaseth playing, they will fall down to the ground
as if apoplectic, and not stir again till the music is renewed.
Many people have laughed at the whole history of the bite
of a tarantula, from this one accident of its poison being
cured.
cured by music; but all who have been upon the spot attest it. Valett. de Phaleng. Apulo.

To such extraordinary facts, it is no wonder a few fables should be added; as, for instance, that the patient is no longer infected than while the insect lives; and that the tarantula itself dances, all the while, to the same air with the peron bitten.

Dr. Dominico Cirillo, professor of natural history at the university of Naples, positively contradicts the testimonies above recited. Having had an opportunity of examining the effects of this animal, in the province of Taranto, where it is found in great abundance, he affirms that the surpuibing cure of the bite of the tarantula by music, has not the least truth in it; and that it is only an invention of the people, who want to get a little money, by dancing when they say the tarantum begins. He makes no doubt but the heat of the climate contributes very much to warm their imagination, and to throw them into a delirium, which may be in some measure cured by music; but several experiments have been tried with the tarantula; and neither men nor animals, after the bite, have had any other complaint, except a very trifling inflammation on the part, like that produced by the bite of a scorpion, which goes off by itself without any danger at all.

In Sicily, where the summer is still warmer than in any part of the kingdom of Naples, the tarantula is never dangerous, and music is never employed for the cure of the pretended tarantum. It is without doubt very extraordinary, fays this writer, that a man of sense, and a physician of great learning, as Bagliani was, should have been satisfied with the account of this disorder; and that, instead of examining the facts by experiments, he should rather have tried to explain it: but even philosophers like very much to meet with wonderful and extraordinary things, and though they are against all reason, fill they want them to be true, and endeavour to find out the cause of them. Every year this surpuing disorder | loes ground; and he is persuaded, that in a very little while it will entirely lose its credit. The Neapolitan phisicians all look upon the tarantula in the same light, particularly after the ingenious book published on this subject by the learned Dr. Serao; who, by various experiments, has proved, that the bite of the tarantula never produced any bad effects, and that music never had any thing to do with it. Phil. Trans. vol. 4s. art. 22.

The bite of the tarantula, and the method of its cure, were, however, for many years subjects of elaborate discussion; and different theories were proposed for explaining them, some account of which it may not be improper to preferre.

Theory of the Tarantula's Bite, by M. Geoffroy. The poisonous juice injected by the tarantula, M. Geoffroy conceives, may give the nerves a degree of tension greater than is natural to them, or than is proportionate to their functions; and hence may arise a privation of knowledge and motion. But, at the same time, this tension, equal to that of some strings of an instrument, puts the nerves in unison to certain tones, and obliges them to shake, after being agitated by the undulations and vibrations of the air proper to those tones. And hence this wonderful cure by music: the nerves, thus restored to their motion, call back the spirits thither, which before had abandoned them.

It may be added, with some probability, and on the same principles, that the patient's aversion for some colours arises hence, that the tension of his nerves, even out of the paroxysm, being still different to what it is in the natural state, the vibrations those colours occasion in the fibres of the brain, are contrary to their disposition, and occasion a kind of displeasure, the effect of which is pain.

Theory of the Effect of the Tarantula's Bite, by Dr. Mead. The malignity of the poison of the tarantula seems to consist in its great force and energy, whereby it immediately raises an extraordinary fermentation in the whole arterial fluid, by which its texture and shape are considerably altered: the consequence of this alteration, when the ebullition is over, must necessarily be a change in the cohesion of its parts, by which the globules, which did before with equal force press each other, have now a very differing and irregular natures, or actions; so that some of them do firmly adhere together, as to compose molecule, or small clusters: upon this account, as there is now a greater number of globules contained in the same space than before, and the impulse of many of these, when united together, differing according to the conditions of their cohesion, as to magnitude, figure, &c. the impetus with which this fluid is driven towards the parts, will not only be felt at some strokes greater than ordinary, but the pressure upon the blood-vessels must be very unequal and irregular; and this will be particularly felt in those which are most easily dilated, as those of the brain, &c.

Upon this, the nervous fluid must necessarily be put into various undulatory motions, some of which will be like those, which different objects, acting upon the organs or passions of the mind, do naturally excite in it; upon which such actions must follow in the body, as are usually the consequences of the several species of fadness, joy, despair, or the like determinations of thought. This, in some degree, is a emulation of the blood, which, the more certainly, when attended with uncommon heat, as is the case, in those countries where these creatures abound, produce such like effects as those: because the spirits separated from the blood thus inflamed, and compounded of hard, fixed, and dry particles, must unavoidably share in this alteration; that is, whereas their fluid consists of two parts, one more active and volatile, the other more vivid and glutinous, which is a kind of vehicle to the former: their active part will bear too great a proportion to the vivid; and consequently they must have more than ordinary volatility and force; and will, therefore, upon the least occasion imaginable, be irregularly determined to every part.

Whereupon will follow tremblings, anger, or fear, upon a light cause; extreme pleasure at what is trivial, as particular colours, or the like; and, on the other hand, sadness at what is not agreeable to the sight; any laughter, obscene talk and actions, and such other symptoms as attend persons bit; because, in this constitution of nervous fluid, the most slight occasion will make as real a reflex and undulation of it to the brain, and present as lively species there, as the strongest cause and impression can produce in its natural state and condition: nay, in such a confusion the spirits cannot but sometimes, without any manifest cause at all, be hurried towards those organs, which at other times, they have been most frequently determined; and every one knows which these are in hot countries.

The effect of music on persons touched with this poison confirms the doctrine above delivered. For muscular motion, we know, is no other than a contraction of the fibres, from the arterial fluid's making an effervescence with the nervous juice, which, by the light vibration and tremor of the nerve, is derived into the muscle.

Thus there is a twofold effect and operation of the music, that is, upon the body and the mind: a brisk harmony excites
eites lively species of joy and gladness, which are always accompanied with a more frequent and stronger pulse, or an increased impulse of the liquor of the nerves into the muscles; upon which suitable actions must immediately follow.

As for the body, since it was sufficient to put the muscles into action, to cauze those tremors of the nerves, by which their fluid is alternately dropped into the moving fibres, it is the same thing whether it be done by the determination of the will, or the outward impressions of an elastic fluid: such is the air; and that sounds are the vibrations of it, is beyond dispute: these, therefore, rightly modelled, may shake the nerves as really as the imperium voluntatis can do; and, consequently, may produce the like effects.

The benefit of music arises not only from their dancing to it, and so evacuating by sweat a great part of the inflammatory fluid; but, besides this, the repeated percussions of the air hereby made, by immediate contact, shaking the contractile fibres of the membranes of the body, especially those of the ear, which, being contiguous to the brain, communicate their tremblings to its membranes and veffels: by these continued succeffions and vibrations, the cohesion of the parts of the blood is perfectly broken, and the farther coagulation prevented; so that the heat being removed by sweating, and the coagulation by the contraction of the muscular fibres, the wounded person is restored to his former condition.

If any one doubts of this force in the air, he may consider, that it is demonstrated in mechanics, that the smallest percussion of the smallest body may overcome the reftance of any the greatest weight, which is at rest; and that the languid tremor of the air, which is made by the found of a drum, may shake the largest edifices.

But, besides this, we must allow a great deal to the determinate force, and particular modulation of the trembling percussions; for contractile bodies may be acted upon by one certain degree of motion in the ambient fluid, though a greater degree of it, differently qualified, may produce nothing at all of the like effect. This is not only apparent in two common stringed musical instruments, tuned both to the same height; but also in the trick which many have of finding the tone or note peculiarly belonging to any wine-glass, and, by accommodating their voice exactly to that tone, and yet making it loud and falling, make the vessel, though not touched, start to tremble, and finally to burst; which it will not do, if the voice be either too low, or too high.

This makes it no difficult matter to conceive, why different perfons, infected with this sort of venom, do require a different sort of music, in order to their cure; inasmuch as the nerves and contractile membranes have different tenions, and consequently are not all alike to be acted upon by the same vibrations.

TARANTULA, in Zoology, is also the name given by the Italians to a peculiar species of lizard, called by Aldrovand, and some others, lacertus facetanus.

It is of a grey colour; its skin is extremely rough; and it is thicker and rounder bodied than the other lizards. It is found, like our common eft, under old walls, and among the ruins of buildings, particularly in the neighbourhood of Rome, in great plenty; its colour looks dead and ghastly, and it is as odious to the sight among the Italians, as the toad is with us, being never seen without a sort of natural horror. It is esteemed also a poisonous creature, as the toad is with us; though it is not easy to find well-attested stories of any body's ever having been hurt either by the one or the other of these creatures. Ray,

TARAPACA, in Geography, a town of Peru, in the bithorpiz of Arequipa, on a river which soon after runs into the Pacific ocean, S. lat. 26° 10'.

TARAPILLY, a town of Hindooftan, in Combeftor; 20 miles N.E. of Dumicotta.

TARARE, a town of France, in the department of the Rhone and Loire; 18 miles W.N.W. of Lyons.

TARAS, in Ancient Geography, a small river of Italy, which passed to Tarentum, and probably gave it its name.—Alto, a river of Italy, in Apulia.—Allo, a river of Epirus.—Alto, a town of Afa Minor.—Allo, a river of Seythia.

TARAS, in Geography, a town of the duchy of Wurzburg; 2 miles N.W. of Hafturt.

TARASCO, in Ancient Geography, a town of Gallia Narbonensis, on the left of the Rhone, and west of Are- late.

TARASCON, in Geography, a town of Spain, in New Cafile; 22 miles S.W. of Huete.—Alto, a town of France, and principal place of a district, in the department of the Mouths of the Rhone, on the Rhone, with a castle, fortifi ed in the ancient manner. It is situated opposite Beaucarac, with which it communicates by means of a bridge of boats. The number of inhabitants is about 7000; 3 polls E. of Nimes. N. lat. 43° 48'. E. long. 4° 44'.—Alto, a town of France, and capital of the department of the Arriage, on the river Arriage. It is a town of manufactures of iron; 48 miles S. of Toulouse. N. lat. 42° 50'. E. long. 1° 41'

TARASOVA, a town of Raffia, in the government of Irkut, on the Lena; 12 miles S. of Tutura.

TARATATO, a town on the east coast of Fortavenu- tura, one of the Canary islands.

TARUMARA, a large province of North America, in the north-east part of New Bifay, bounded on the west by Sonora, on the east by New Mexico, its limit being the Rio Bravo. On the south it borders on Chialoa. Alcedo computes the extent at 100 Spanish leagues from east to west, and as much from north to south. This province was discovered in 1614, and derives its name from a savage nation found there, of pacific dispositions. This province contains 48 pueblos, or villages, or nations of Francican missionaries, exclusive of the capital of St. Felppe de Chiguaga. It is chiefly rich in mines, the minerals being fmeled at the Real, or royal fation of St. Eulalia, or probably the Real Nueva in the maps, in N. lat. 29° 30'.

TARAXACUM, or Taraxacon, in Botany, a name used by the Arabian, supposing by Ambrofii to have been derived from the Greek ταράξεις, eatable, because the plant to which it was applied, (our Dandelion, or something nearly akin,) was used for food. De Theis derives it, with more appearance of probability, from ταράξεις, to move, or trouble, because of the laxative and diuretic quality of the plant in question, commemorated in its vulgar English, as well as French, appellation. See LEONTODON; at the end of which botanical article, we must observe, genus of Leon- todon is printed by mistake for gender.

TARAXIPUS, formed of ταράξεις, to frighten, and ἔνευς, horse, a kind of evil genius, the itate of which was erected in the Grecian hippodromes, in order to alarm and frighten the horses in their course. The shape and form of this strange deity are not described; but he certainly answered the end for which he was designed: it frequently happening, that the horses were so frightened at his appearance, as to turn away with the utmost violence, and expose the lives of their riders or drivers to the most imminent danger. Many con- jureres have been formed concerning this strange deity, and the means he used to frighten the horses; but the most probable
bale conclusion will be, perhaps, to suppose that some tricks and artifices were practised under the disguise of this figure, either with a design to render the victory more honourable in proportion to the difficulty of gaining it, or else that this horse-frightening deity was placed in the course as a touch-hole, to prove the resolution and temper of the horses; and to oblige the candidates to bring none into the field but such as by exercise and discipline were sufficiently and steadily, as not to let their obedience be shaken upon the most trying occasions. Berenger's Hist. and Art of Horsemanship, vol. i. p. 54. See Stadum.

TARAXIS, from τάραξις, to disturb, in Surgery, a slight ophthalmia, or inflammation of the eye. See Ophthalmia.

TARAZ, in Geography, a river of Independent Tartary, which runs into the Sird or Jaxartes at Otrar. Some suppose this to be the same with the river Tulas; but others represent it as a much more inconsiderable stream.

TARAZ, or Turkistan, a city of Asia, and capital of the country of Turkestan, situated on a small river which runs into the Sirr, 250 miles N. of Samarcand. N. lat. 44° 45'. E. long. 66° 42'.

TARAZONA, a town of Spain, in New Catalonia; 15 miles S. of Alarcon.—Allo, a city of Spain, in Aragon, the see of a bishop, suffragan of Saragozza. This town is ancient, and was destroyed by the Moors in the year 724, and by the same people rebuilt in the beginning of the 12th century; 43 miles N.W. of Saragozza. N. lat. 42°. W. long. 1° 43'.

TARBA, in Ancient Geography, a town situated on the southern coast of the isle of Crete.

TARBARSON, a word used by some chemical writers as a name of antiquity.

TARBASSUS, in Ancient Geography, a town of Asia, in Paphia.

TARBAT, in Geography, a town of Scotland, in the county of Cromarty. This parish originally belonged to the county of Ross, but was separated from it and annexed to Cromarty, in 1693; 6 miles E. of Tan.

TARBAT NESS, a cape of Scotland, on the east coast of the county of Ross, between the friths of Dornoch and Moray. N. lat. 37° 52'. W. long. 3° 45'.

TARBE, a city of France, and capital of the department of the Upper Pyrenees, built on the ruins of the ancient Bigorre: before the revolution it was the see of a bishop, and residence of a governor. It consists principally of one street along the Adour, and is defended by a castle; 7½ miles S. of Auch. N. lat. 43° 14'. E. long. 6° 8'.

TARBELLI, in Ancient Geography, a people of Gaul, in Aquitania, whole territory extended along the Aquitanian gulf.

TARBERT, in Geography, a post-town of the county of Kerry, Ireland, on the river Shannon, where there is a charter-school. It is 124 miles S.W. from Dublin. There is also a small island of this name off the coast of Galway.

TARBIDO, or Marazzo, a river of Naples, which runs into the Mediterranean, 13 miles S.W. of Cofenza.

TARBON, a town of Hungary, on the river Theeye; 14 miles N.N.E. of Kifkarda.

TARBUCH, or Tarborough, a town of North Carolina, on the Tar; 45 miles N.N.W. of Newbern. N. lat. 35° 52'. W. long. 77° 44'.

TARBUT, a city of Persia, in Khorsafan, eight furlongs distant from Turshih; with a population of about 8000 persons, defended by a strong wall, and flanked with towers. Provisions are here plentiful and cheap; it has 220 dependent villages, and is possessed by its Khan, a powerful chief, who can bring into the field an army of 16,000 men.

TARCHI, in Biography, a Neapolitan composer, who arrived in England in 1786, at the same time as Rubinielli. He was young at that time, but though he remained here only one season, he discovered considerable abilities, and seemed advancing rapidly into fame. He had fire, taste, and invention. If he still lives, we make no doubt but that he ranks high among the dramatic composers of his country.


Gen. Ch. Common Calyx, turbine, of one leaf, cut half way down into (for the most part) seven rather acute segments, coloured internally, shorter than the corolla, permanent. Cor. compound, uniform, of about twenty flowers, all perfect, equal, each of one petal, funnel-shaped, with five teeth. Stam. in each flower, Filaments five, capillary, very short; anthers united in a cylindrical tube, as long as their own partial corolla, with a filamentous appendage at the base. Pist. in each flower, German inferior, oblong; style twice the length of the floret; stigmas two, divaricated. Peric. none, except the permanent calyx. Seeds solitary, ovate-oblong, compressed. D.am. woolly, investing every part of the seed. Recept. minute, clothed with woolly hairs, the length of the calyx.

Obf. The seed-down is very remarkable, as not crowning but entirely investing the seed. Linn. eff. Ch. Receptacle villous. Seeds invested with hairs. Common calyx of one leaf, turbine, cut half way down into several segments. Anthers spurred at the base.

1. T. camphoratus. Drabuly African Lebabsane, or aromatic Taragon-bloomin. Linn. Sp. Pl. 1179. Suppl. 261. Will.d. n. 1. Ait. n. 1. (Elischyro affinis africana arborecum, floribus purpureo-violaceis, foliis Salvia, odore Rosmarini; Herm. Lugd.-Bat. 228. t. 229. Plu. Phyto. t. 174. f. 1.)—Leaves elliptic-oblong, nearly entire; densely downy beneath. Native of the Cape of Good Hope, from whence it was brought very early into the gardens of Europe. This is a greenhouse evergreen shrub, or small tree, flowering from June to October. The branches are angular, tuberculated, densely downy and hoary. Leaves scattered, twelled, two or three inches long, more or less acute, somewhat wavy, entire or minutely toothed; their upper side of a dark dull green, quite smooth, reticulated with fine veins; the under white and cottony, with a prominent rib and veins. When bruised they smell like rosmarin, but less agreeably. Pani-cles terminal, many-flowered, with numerous lanceolate bracteas, all together hoary, like the branches. Segments of the calyx from five to seven, or more. Flores dark dull purple, with whitish anthers. Seeds enveloped in copious white wool, like those of an Eriocerephalus; fee that article.

2. T. ellipticus. Oval-leaved Taragon-bloomin. Thumb. Prodr. 145. Will d. n. 2.—"Leaves elliptical, finely toothed; densely woolly beneath."—Gathered by Thumbner at the Cape. We have seen no authentic specimen from him, but there are some in the Linnean herbarium which answer to the
the specific character, though they are obviously a mere variety of the foregoing.

3. *T. racemosa*. Cluster-flowered Taragon-blossom. Thunb. Prodr. 145. — "Leaves elliptical, pointed, finely toothed; denely woolly beneath." — From the same country. This is perhaps but another variety. The leaves of *T. camphoratus* vary in acuteness. Willdenow feels accidentally to have omitted this in describing. It should have been his

n 3.

4. *T. lanceolatus*. Lanceolate Taragon-blossom. Thunb. Prodr. 145. Wild. n. 4. — "Leaves elliptical, entire, smooth." — Gathered at the Cape by Thunberg. His specific name is exceptional, when compared with the characters of this and the rest of the species. We must rely on him for the synonymy of the following, being his own discovery; or we should have presumed, without seeing specimens, that the plant before us might be *T. glaber* of Linnaeus.

5. *T. dentata*. Toothed Taragon-blossom. Thunb. Prodr, 145. Wild. n. 5. (T. glaber; Linn. Suppl. 360, according to Thunberg.) — "Leaves oblong, entire or toothed; slightly downy beneath." — Gathered by Thunberg at the Cape. We have seen no specimen. Linnaeus describes his plant as extremely like *T. camphoratus*, but quite smooth, and without any smell. It varies with narrower or broader leaves, sometimes entire, sometimes toothed.

6. *T. ericoides*. Heath-like Taragon-blossom. Linn. Suppl. 360. Wild. n. 6. — Leaves oblong, smooth, imbricated in four rows. Calyx in four deep segments. — Native of the Cape of Good Hope. A rigid shrub, with copious, round, irregular branches, whole points sometimes taper into a spinous point. Leaves like those of many *Erica*, minute, scarcely a line in length, elliptic-oblong, obtuse, entire, concave, smooth on both sides, dotted, aromatic when rubbed, imbricated in four rows on the very short, opposite, lateral flouts. Flowers solitary at the end of these flouts, each on a short silky flaky. They are erroneously termed "confertis" in the Supplement, being no otherwise crowded than because the little branches which bear them are fo. Calyx in four very deep, elliptical, smooth, redish divisions, very aromatic. Flores few, minute, concealed in the copious woolly hair, which is twice the length of the calyx.

Linnaeus justly observes of this last species, that its genus is rather doubtful. We conceive it might as readily be supposed an *Ericocephalus*, and if the leaves could by any means be called frillform, we might guess it to be *E. glaber*, Thunb. Prodr. 168, a species not adopted in our account of that genus; (where Lamarck Ital. t. 717, ought to have been quoted after Juss. 186.) The above conjecture is strengthened by Thunberg's having mentioned no *Tarchananthus ericoides*, nor, as far as we can discover, has he described the shrub in question under any other name. We beg leave to remark that the species of this whole genus, except the original one, are involved in much uncertainty, nor are the materials with which we are furnished sufficient to enable any botanist to form an opinion about them.

*Tarchananthus*, in *Gardening*, contains a plant of the shrubby evergreen exotic kind, of which the species that is most commonly cultivated is the shrubby African fleabane, (*T. camphoratus*), which has a strong woody stem, that rises to the height of twelve or fourteen feet, sending out many woody branches at the top, which may be trained to a regular head.

**Method of Culture.** — This is a plant that may be increased by cuttings, which should be planted out in the spring or early summer seafons, in pots filled with light mould, giving them shade and water occasionally. They soon strike root, and in three or four months may be potted off into separate pots, affording them shade and water as before, and placing them under shelter. They also strike root in the summer season, when planted in a common border, and covered with hand-glasses, and may in these cases be potted off in the autumn.

Afterwards they require the management of other hardy greenhouse plants. The plants do not produce ripe seeds in this climate.

They afford variety in these different situations.

*Tarda avis*, in *Ornithology*, a name given by many to the buffard, more commonly known among authors by the name *otis*.

*Tardeets*, in *Geography*, a town of France, in the department of the Lower Pyrenees; 6 miles S. of Maul-peon.

*TardiGRADUS*, or *Sloth*, in *Zoology*. See *Bra- dypus*.

*TARDO*, in the *Italian Mafic*, is used to denote a slow movement, being much the same as *largo*.

*Tardoire*, or *Tardoure*, in *Geography*, a river of France, which runs into the Charente, near Rouchefaux.

*TARDOU*, Et., a town of Spain, in the province of Cordova; 28 miles W. of Cordova.

*TARDSONG*, a town of Thibet; 250 miles E. of Laffa. N. lat. 29° 54'. E. long. 95° 34'.

*TARE*, in *Botany*. See *Vetch*.

*Tare*, in *Agriculture*, a well-known plant of the vetch kind, of which there are two sorts; the common purple-flowered spring or summer tare, and the purple-flowered wild or winter tare; the latter of which fort is by much the hardiest.

Numerous experiments in the culture of these different kinds of tares, were made by the Rev. Mr. Laurents, in order to ascertain their differences in hardiness, for which we refer to the Corrected Agricultural Survey of the County of Suffolk.

It is evident from the tall, close, hardy growth and succulent quality of the winter tare, that it must be a plant of much value to the farmer, as affording an abundant produce of green food for animals; and by being alternated with those of the grain kind, in ameliorating or preventing the exhaustion of the land that must otherwise take place. It has been suggested by the writer of the Agricultural Survey of the County of Middlefex, that it may be the means of enabling the arable farmer to support as much live-flock as the grazier, as while crops of this fort remain upon the ground, they afford larger supplies of the kift kind of green food on the acre than the most rich and fertile grass lands; and they may be taken from the ground at fo early a period in the summer season, as on the frail loamy foils to admit of a clean crop of turnips, &c. being obtained from the same land in the same year; and of those of the more heavy kinds being prepared and toun with wheat. And while they are capable of being raised with success on most sorts of soils and situations, they support and fatten cattle and sheep of different sizes and breeds in an expeditious manner. And further, they afford a good preparation for other sorts of green crops, and in that way keep up the succcession of such sorts of food for the fattening of additional numbers of animals, and in that manner afford abundance of manure in situations where it could not otherwise be procured. On
TARE.

the whole, he supposes, that by a judicious combination of this plant with those of turnips, clover, and fainfoin, the poor downs, sheep-walks, and other waste lands may be rendered from ten to thirty times more valuable than they are in their present state.

The tare in all its varieties is a plant which, in respect to soil, according to the author of the Prefent State of Husbandry, admits of considerable latitude, growing without difficulty or trouble on all the varieties, from that of the thin gravelly, to those of the deep and fluff clayey kinds, but flourishing in the mofl vigorous and perfect manner on those of the gravelly, loamy descriptions, that are not too moist or wet at particular feasons.

With regard to the preparation of the land for this fort of crop, there is little care necessary than for many other kinds of grassy sorts of crops, as it will succeed well where the soil has not been so much broken down, or reduced into fine mould; but it always grows in the most perfect and vigorous manner where a good degree of pulverization and fineness has been produced in the land by proper tillage. But in common, two or three ploughings, with occasional good harrowings in the intermediate times, may be fully sufficient for the purpose, at whatever season the crop is to be put into the ground.

As to the sowing of the seed of this crop, it has been observed, that as the seed of the spring tare does not succeed well when sown for the winter crop, nor that of the winter kind when put in for the summer product, care should be taken to keep the seeds of the two sorts as perfectly distinct as possible. And that as they are, from their being both of nearly the fame colour and size, as well as their agreeing in other particulars, extremely liable to be mixed in the seed-hops, it may be the best practice for the cultivator to preserve his own seed, as, by that means he may not only be certain of having the seed good in its quality, but of the right sorts, and, of course, may depend more fully on his crops. And it has been suggested by the writer of the Middlesex Report on Agriculture, that sowing the seed in dry feasons may be of utility in promoting the quick vegetation of the crop in many situations of land and peculiarities of seafon. With regard to the quantity of seed that should be employed, it should, of course, vary according to the nature of the soil, and the time as well as manner of sowing. But from two bushels to two and a half are the proportions most commonly recommended in the broad-call method of sowing. But on poor sorts of land, where the seed is sown late, and the climate is backward, three bushels may not be too much. And it has been also observed by a late writer, that where the crops are either to be cut for foiling, or to be fed down by live-flock, the proportion of seed should be considerably increased, as not only a greater produce is thereby provided, but the growth of the crops rendered more quick and full. In the drill method of sowing, when at the distance of six inches, two bushels of seed will be quite sufficient; and where the distances are larger, still smaller proportions of seed will answer the purpose.

In regard to the periods and manner of sowing these sorts of crops, it is evident that the former must vary with the intentions of the cultivator; but the winter sowings should be performed some time between August and October; and in exposed situations and poor soils, more early than in those of the contrary description. As for the spring sowings of these crops, they may be executed from the beginning of March to the end of April, or even earlier, with success. In some places, as on the down lands in Sussex, they find great advantage from sowing spring tares in June with a light mix-

ture of rape or cole seed, as about a quart to the acre, on the same land, as furnishing a good and nutritious feed for weaned lambs in the autumnal seafon.

With regard to the mode of fostering crops of this nature, it is mostly that of the broad-call, which should be performed as evenly as possible over the surface of the well-prepared land; the seeds being afterwards well covered in by proper harrowing, in order to prevent their being picked up by birds, and to ensure their perfect vegetation and growth. It has been suggested, however, that in rich clean soil, it is probable the row method would succeed well with this fort of crop, as is the practice in some of the southern districts of the island, according to a late practical writer. And with some it has been the custom to sow a little rye with their winter tare crops, and a small quantity of barley with those of the spring, on which, however, it has been well observed, that as plants of different sorts never succeed well together, it is probable that little advantage can be derived from the practice, especially as the tare is not a plant that stands much in need of protection in the early flages of its growth, and may be injured by too much shade and clover. The former of these sorts of feed, and some others, may, however, be occasionally blended with it, and sown as a good green feed for some sorts of young animals, as already noticed.

It has been suggested in the first volume of the Farmer's Magazine, that the most productive method of fostering this crop, when intended for feed, is to mix them amongst grass when drilled, at the rate of one firlot of tares to one boll of beans.

It is further stated, however, that when tares are intended for green food, there is no necessity for mixing them with beans. But that when such is the purpose, they require to be sown tolerably thick, so as the surface may be early covered; and if the ground is good, and recently duned, an acre of them will afford as much keep for horses and cows, as can be gained from a full clover crop; at least the writer has found them quite as beneficial.

It has been found that crops of this sort are capable of being grown well after wheat or barley, but that they may be grown after almost any sort of crop where the land is in good heart, and properly prepared for the purpose.

In regard to the after-management of these sorts of crops, from their covering the land in a very complete manner, when they are sufficiently full, they do not require any great attention during their growth.

And in the process of making tare-crops into hay, more attention is found necessary than in those of mofl of the artificial grasses, as wet is more injurious to them, and they require more sun and air; but in other respects they demand the same cautious management, in order to prevent the foliage from being lost.

The most proper time for cutting for this purpose is, according to the author of the Synopsis of Husbandry, when the blossoms have declined, and the crops begin to fall flat on the ground. When well made, the hay is of the best and most nutritious quality or properties, being extremely useful in many intentions.

The writer of the Report of the State of Agriculture in Middlesex, states the produce as the result of experience, in having frequently weighed green tares, to be ten or twelve tons per acre, which is a large crop. And when made into hay, at about three tons the acre, which shews the vast disadvantage of making these crops into hay. The value of the produce, estimating it as if the whole were made into hay, being in that district from twelve to fifteen guineas the acre; and in situations where other sorts of hay fell at fifty shil-
lugs or three pounds, at from about seven pounds ten
shillings to nine pounds the acre. And it is found that the
spring tare-crops are lighter, and most liable to be injured by a
dry season.

The produce in seed is likewise found to be considerable,
being by some estimated at from three to six facks; but in other
instances forty bushels or more have been obtained from the
acre. It has been suggested, that this sort of feed is
greedily devoured by pigeons, and that it may probably be
used for poultry with advantage and profit, as being a very
stimulant sort of food in the production of eggs.

In respect to the application of tare-crops, it has been well
remarked by a late writer, that there can be little hesitation
in pronouncing that of foiling them with horses or other
forts of live-stock on the farm, as the most advantageous and
beneficial method of any which can be adopted for them.

It has, however, been advised by the author of the Agri-
cultural Survey of the above district of Middlesex, that the
farmer's flock should be wholly supported on them, from
the time they begin to blow till the bloomes begin to fall
off, and the formation of pods to take place. And, on ac-
count of the risk from wet, he advises that all the stock of
a farm should be fed on them green, as it will have the
good effect of taking the stock off the grass land long
enough to allow of its being mown for hay; and by this
means the meadow-hay be much increased in quantity, and
there will not be so much occasion for pasturage, the tares
abundantly supplying its place. And that besides, at the
time the cattle return from green tares, the grass land in the
mean time having been mown, may be ready to receive them.
The same able writer remarks, in addition, that as it would
be wasteful in the extreme to turn live-stock into a field of
tares, as their treading and lying down would do great mis-
chief to the crop, even by feeding it in small patches hurried
off; the most advisable method would be to mow the tares
of the first half acre, and to carry the produce into the
stables, cow-houses, and fold-yards, or on poor land, to be
confum'd by stock; then to hurdle the growing tares from such
cleared ground, into which put the stock, and feed them
all with the tares, given to them in racks, removing
the hurdles and the racks forward daily to the edge of the
growing tares; which will manure the land uniformly, and
deposit all the urine in the soil. But the writer of the Cor-
rected Gloucester Report on Agriculture, has stated another
method of proceeding, where sheep are the fort of stock
employed, which seems by no means ineligable, viz.; to
feed them through rack hurdles, which are made the fame
as the common five-barred ones, only leaving the middle rail
out, and nailing upright pieces acrots, at proper distances, to
admit the sheep to put their heads through. A swathannet of
vetches being mown in the direction you wish to plough the
land, a sufficient number of these hurdles, allowing one to
two sheep, are set up close to it: at noon, the shepherd
mows the swath and throws it to the hurdles, and the same
at night: next morning, a swath being first mown, the
hurdles are again set, thus moving them once in the twenty-
four hours. By this trifling additional trouble, the vetches
are, it is said, eaten clean off, and the land equally benefited.

The writer of the Hertfordshire Corrected Agricultural
Report remarks, that in the heavy land districts, he has
found tares very generally cultivated for foiling the teams;
a husbandry, he thinks, that cannot be too much commended.
And he contends farther, that it appears by the writings of
Ellis, that this branch of agriculture was common in this
county above sixty years ago, before it was at all practised in
many other counties, and he was glad to find it holds its
place steadily in the management of the present period. It

is noticed, that Mr. Leach, of the same distriet, manures for
tares, and that they are mown early, and then three cars
are given to the land, when he gets good turnips after them.
And that they are universal about Rickmanworth and
Watford, many being fed off by sheep.

And the same writer says, in his Agricultural Survey of
Norfolk, that the culture of this plant has increased very
considerably in that distriet: within his memory they are
multiplied at least tenfold.

And that Mr. Overman there begins fowing winter tares about Michaelmas, once more before Christmas, and sometimes twice or thrice more, with spring tares for a succedant. That after mowing, he does
not plough the land, but runs sheep over it till the wheat-
rowing. But that the cultivator who has made by far the
greatest exertions in this husbandry that he ever met with, is
Mr. Purdis, of Eggmore, who has 300 acres every year,
feeding no more than is necessary to supply himself: they
are fed by his sheep; used in foiling his numerous horses;
and immense quantities made into hay.

It is suggested, as the remark of Mr. Bitle, that the
fowing tares for summer-feeding sheep, is an absolutely new
improvement in the husbandry of West Norfolk, and that he
thinks it a very great and important one.

And in both the counties of Gloucester and Worcefter, it
is the practice to sow these crops as patturage or feed for
horses, and eat or get them off early enough to allow of
turnips being sown the same season. But, as in the wet
seasons, when the tare-crops are large, the flemens are apt
to become rotten upon the ground, and in this condition fuch
food often proves prejudicial to the horses; in all such cafes,
it will be imprudent to cut or eat them any longer for the
purpose of foiling in these ways.

It is noticed in the twenty-second volume of the Annals
of Agriculture, that in the county of Suffix, these forts of
crops are of such use and importance, that not one-tenth of
the stock could be maintained without them; horses, cows,
sheep, and hogs, all feed upon them, the hogs are soiled
upon them without any other food. This plant maintains more
stock than any other plant whatsoever. Upon one acre,
Mr. Davis, of this distriet, can maintain four horses in
much better condition than upon five acres of grass. Upon
eight acres he has kept twelve horses and five cows for three
months without any other food. No artificial food what-
ever is equal to this excellent plant in his opinion.

They here find this crop to be a hearty and most nourish-
ing food for all sorts of cattle. Cows give more butter
when fed with this plant than with any other food what-
soever. And by having one crop of vetches succeeding
another, Mr. Hallfhead, in the fame county, infuries a crop
the whole summer of the best food that can be given to
cattle; after this, he sows turnips, and then wheat.

In many of the southern counties, as Cornwall, Devon,
Kent, and some others, the culture of this fort of crop
might be greatly extended with vast advantage, especially if
it were grown with the view of foiling different kinds of live-
stock, to which purpose it is by far the best suited. Also,
in many cafes, as a highly valuable early fort of green spring
feed for many kinds of young animals; the climates and
soils being mild, and particularly favourable for their very
erly production and abundant growth, when sown at the
most proper season.

It is remarked also, that they have on the South Downs
an admirable practice in their course of crops, which cannot
be too much commended, that of substituting a double crop
of tares, instead of a fallow for wheat. Let the improving
cultivator give his attention to this practice, for it is worth,
in the opinion of the writer, a journey of five hundred miles.

They
They sow forward winter tares, which are fed off late in the
spring, with eves and lambs; they then plough and sow
further tares and rape, two buffels and a half of tares, and
half a gallon of rape; and this they feed off with their lambs
in time to plough once for wheat. A variation is for mow-
ing, that of foing tares only in succession, even to late as
the end of June for foiling. See Soiling.

Tare and Tret, in Commerce, any defect, waste, or di-
mination in the weight, the quantity, or the quality of
goods.

The seller is usually to account to the buyer for the tare
and tret.

Tare is more particularly used for an abatement, or de-
duction in the price of a commodity, on account of the
weight of cheats, casks, bags, &c. in which goods are put
up, and whose weight may be known separately from that of
the goods; and which being subtracted from the grofs
weight, or that of the cask, &c. and goods together, gives
the weight of the goods alone, or the nett or neat weight.
But if the tare is not known separately, and an allowance
made for it at so much per hundred weight, or hundred
yards, &c. then the deduction of the tare is by the rule of
three.

Before the tare is taken off, the allowance called the
draft or draught is subtracted from the original or grofs
weight of goods.

Tare is distinguished by a variety of denominations; thus:
Real tare, or open tare, is the actual weight of the
package; cymatory tare is an established allowance for the
weight of the package; computed tare is an estimated allow-
ance agreed upon at the time; average tare is when a few
packages only among several are weighed, their mean or
average taken, and the rest tared accordingly; super tare is
an additional allowance or second tare, when the commodity
or package exceeds a certain weight.

When tare is deducted, the remainder is called the nett
weight; but if tret be allowed, it is called the juttle
weight.

Tret is a deduction of 4 lbs. from every 104 lbs. of the juttle
weight.

There was another allowance that was formerly made for
draft or sand, or for the waste or wear of the commodity
on foreign articles paid by the pound avoidus; but this is now
nearly discontinued by merchants, or rather allowed in the
price. It is wholly abolished at the East Indian warehouses
in London, and neither tret nor draft is allowed at the
custom-house.

The allowance called tret is calculated in the same way
with tare. Ex. 1.—At 7 lbs. tare, or tret, to 112 lbs. grofs,
what is the tare, and also the nett weight, when 746 lbs. grofs
were received? say, as 112 lbs. to 7 lbs. fo is 746 lbs. to the
tare fought, which subtracted from 746 lbs. the remainder is
the nett weight.

Ex. 2.—At 5 lbs. tret to 112 lbs. grofs, what grofs weight
must be received, when 83 lbs. nett was paid for: and how
much is allowed? subtract 5 from 112, then fay, as 107, the
remainder to 112, fo is 84 to the grofs weight fought; the
difference of which and 84 is the allowance. Or thus: as
107 to 5, fo is 84 to the allowance fought, which, added to
84, gives the grofs weight fought. Thus from the grofs
weight, nett weight, and allowance, or any two of these in
one case given, with any one of them in another case, we
find the other two in that other case.

There are sometimes two allowances deducted out of
the same quantity; first tare, and then tret: after the tare
is deducted, the remainder is called particularly juttle or
juttle weight, out of which the tret is deducted, and the tall
remainder is called nett weight.

Ex. 3.—Tare being allowed at 4 to 112, and tret at 5 to
112, what is the nett weight in 87 lbs. grofs? say, as 112 to
107 = 112 — 4), fo is 87 lbs. to the tret; then as 112 to
107 = 112 — 5), fo is the tare to the nett. And if you
multiply 108, 107, and 87 continually, and also 112 by
112, and divide that product by this, the quotient is the new
weight fought. Malcolm's Ar. p. 564.

The tare is very different in different merchandizes: in
some there is none at all allowed. It is a thing much more
regarded in Holland than in England, or elsewhere: a
modern author, M. Ricard, treating of the commerce of
Amsterdam, observes, that the tares are one of the most con-
fiderable articles with which a merchant is to be acquainted,
if he would trade with security.

Sometimes the tare is, as it were, regulated by custom;
but generally, to avoid all disputes, the buyer and seller make
a particular agreement about it.

For a comprehensive and accurate table of the custom-
house and commercial allowances for various kinds of goods,
we refer to the first volume of Dr. Kelly's "Cambit," our
limits not allowing the insertion of it, though the liberality
of the author would not object to our thus availing ourselves
of his labours.

TAREKAB, in Geography, a town of Candahar, on
the Camell; 23 miles E.S.E. of Cabul.

TAREF, a town of Arabia, in the province of Hedjas;
25 miles N.E. of Medina.

TAREIBOA, in Zoology, the name of a species of
ferpent found in America, and called allo cacaboa; though,
according to some authors, the terreiboia and cacaboia are
two different species.

They are both of the amphibious kind, and live in lakes
and waters, as well as on land; but they are not very poi-
fonous. They are small snakes, and all over black; when
offended they will bite, but the wound is curable. Authors
have written differently of those serpents, some making the
latter very different from the former, and of a yellow colour.

Ray.

TAREINSKA, in Geography, a harbour of Kam-
chatka, in Avatcha bay; 10 miles S. of St. Peter and St.
Paul.

TAREIOUT, a town of Brafil, in the government of St.
Francisco; 160 miles S.W. of Femambuco.

TAREIRA, in Ichthyology, the name of a fish caught
in the American seas, and eaten, but of no fine flavour.
It is of an oblong and thick body, gradually tapering toward
the tail; its head resembles that of a snale, and is raised
into two tubercles over the eyes; its eyes are yellow, with
a black pupil; its nose pointed, and its mouth large and
yellow within; it has extremely sharp teeth in both its jaws,
and on its tongue; it has eight fins, the tail being accounted
one, and this is forked; but this, as well as the rest, is of
the confluence of a poppy-leaf, tender, thin, and soft, and
fultained by soft rays; its scales are so nicely laid on one
another, that it seems smooth to the touch; its belly is
white, and its back and sides are variegated with longitudinal
green and yellow lines. Marcgrave.

TAREIRI, in Geography, a river of Brafil, which runs
into the Atlantic, S. lat. 6°. W. long. 34° 43'.

TAREKA, in Hindoo Mythology, is the name of a fort
of demon flain by Rama, in his warfare described in the
Ramayana.

TAREM, in Geography, a city of Persia, in the province
of Larifian, which is a meanly built place, situated in a
plain.
plain on the banks of a salt river. It consists of a mud fort, surrounded on all sides by wretched huts, formed of the branches of a date-tree, which grows in great abundance on the plain. It is the residence of many respectable merchants, who trade to Mâcaal, Gombran, and Shiraz; and contains about 12,000 inhabitants; 30 miles N.N.E. of Lar, which is situated in N. lat. 27° 35'. E. long. 52° 45'.

TAREMDSONG, or TARENGASONG, a town of Thibet; 160 miles S.S.E. of Laffa. N. lat. 25° 40'. E. long. 92° 50'.

TARENT, a city of England, which runs into the Stour, in the county of Dorset, 3 miles S.E. of Blandford. Tarent, an island of the Peloponnesian gulf, close to the shore, and immediately opposite to Kefi; although not so large, is a finer island than Bahrein. It is about four miles long, and about as much in breadth, well supplied with good fresh water, and embellished with many delightful gardens, which produce fruits of various kinds in abundance.

TARENTAISE, County of, a province of Savoy, bounded north by the lordship of Farcigay, east by the duchy of Aosta, south by the county of Maurienne, and west by the duchy of Savoy; erected into a bishopric about the fifth century, and an archbishopric in the eighth. The kings of Burgundy erected it into a county, and towards the end of the eleventh century, Humbert II., earl of Maurienne and Savoy, became master of it, and his descendants held it afterwards. The soil is barren, and the aspect of the country, abounding with mountains and precipices, unpleasing, with little good land. The Ilere crosses it from east to west. In its union with France, it formed part of the department of Mont Blanc.

TARENTO, a city of Naples, and province of Otranto, the fee of an archbishop, situated on a small peninsula, which projects into a bay of the Mediterranean, to which it gives name. Tarentum (which fee) was anciently the capital of a celebrated republic; but after undergoing many revolutions, it was destroyed by the Saracens and Hungarians: soon afterwards it was rebuilt in a new situation. After the total expulsion of the Greeks, duke Robert, the Norman, created his son, Bohemund, prince of Tarento; but his life failing, it was bestowed on Henry, son of king Roger, and afterwards on William, a bastard of that family. It was wrested from him, on account of his illegitimacy, and conferred upon Manfred of Swabia, who long bore the title of prince of Tarento. Its next transfer was made by Charles II. to his son Philip, titular emperor of Constantinople, by whose daughter it was conveyed to the house of Baux. Upon the failure of this family, it was obtained by Raymond Oriffin, a younger son of the family of Nola. King Louisiah, by marrying the widow of Raymond, became master of Tarento. Queen Joan II. gave it to her husband, the earl of La Marche; and he sold it to John Anthony Orifino Balzo, the right owner. When this prince died without issue, Tarento was detached to the crown. The inhabitants, neglecting the culture of the soil, directed their whole attention to fishing. Their number is estimated at 18,000. Its harbour, which was once excellent, is now so shallow as to admit only fishing boats. It is defended by a fort. The bay of Tarento is remarkable for springs of fresh water at the bottom, which, as it is said, may be taken up in a calm from the surface; 60 miles W.W.W. of Otranto. N. lat. 40° 45'. E. long. 17° 10'.

TARENTUM, in Ancient Geography, a town of Italy, in Magna Graecia, upon a small promontory of the Messapia. Tarentum was a very ancient city; some have ascribed its origin to the Cretans, before the Trojan war. In the 2nd Olympiad, a powerful body of emigrants arrived under Phalanthus from Laconia, that it seemed to be refounded. Here they settled upon a plebiscitarian plan, enlarged the fortifications of the city, and transformed it into a near resemblance of Sparta. Places were called by new names; and as most of the nobles had perished in a war with the Japyges, democracy was introduced. The favourable situation of this city, when it was first founded, contributed to its rapid prosperity. Placed in the centre of three seas, it obtained the whole commerce of the Adriatic sea, of the Grecian or Ionian sea, and of that portion of the Mediterranean called the Tyrrhenian sea. The adjacent country was fertile in grain and fruit; the pastures were excellent; the flocks afforded a very fine wool. It is no wonder, then, that the city should become rich, and that riches should be succeeded by luxury. Philosophy was not neglected at Tarentum; and that of Pythagoras gained the preference. The arts were also diligently cultivated. Strabo mentions the gymnasia of this city with high commendation, and the bronze colossus of Jupiter, which was scarcely inferior to that of Rhodes. Fabius Maximus found here abundance of pictures and statues, which served to adorn his triumph. With the wealth of Tarentum, its power also rose above that of all the colonies of Magna Graecia; its land forces were estimated at 32,000 foot and 3000 hores, in constant pay; and thirteen considerable cities acknowledged its dominion. At sea, their fleets rode triumphant and unrivalled. The most brilliant epoch of their history was that of the government of Archytas, whose profound learning as a philosopher, and skill as a mechanic, was no impediment to his political talents and exertions. His virtues also commanded respect. He frequently led the Tarentines to battle, and always returned after successes. With Archytas, however, terminated the prosperity of Tarentum. At length this city partook of the horrors of those wars which devastated the southern part of Italy. The inhabitants not only exposed themselves to the Roman arms by some outrages committed against their ambassadors, but in the year 541 of Rome, Annibal having taken possession of Tarentum, the Romans sent against them a body of troops under Fabius Maximus, who retook it, and gained possession of its ample shores. In the year 664 or 665, it was made municipal; and in process of time, it became a very pleasant city. Whilist Totila was ravaging Italy in the year of Christ 546, the Greeks took possession of Tarentum, but suddenly abandoned it at the approach of a detachment of troops belonging to the king of the Goths; which event occurred in the year 548. In 552 the troops of Narsete retook it; but it was doomed to pass under the dominion of Roswald L., duke of Benevent, in the year 668. On the decline of the Lombard power, the Grecian emperors regained possession of this country, and retained it till Robert Guiffred drove them for ever out of Italy. For its subsequent history, &c., see TARANTO.

TAREYEN, in Geography, a town on the west coast of the island of Celebes. N. lat. 1° 13'. E. long. 119° 12'.

TAREYRAS, a town of Brasil, in the government of Guyas; 75 miles E.N.E. of Villa Boa.

TAREZA, a river of Hungary, which runs into the Samos, 20 miles S.W. of Tokay.

TARF, a river of Tunis, which runs into the Mediterranean, 3 miles S. of Maharef.

TARFE, a town of Egypt; 7 miles W. of Cairo.

TARFOKIRAT, a town of the kingdom of Fez, on the coast of the Mediterranean; 22 miles W. of Meilha.

TARFOWA, a town of Africa, in Tunis, supposed to be
be the ancient Taphrura or Taparura; 24 miles W. of Thaine.

TARIFVALA, a town of Sweden, in the province of Tavastland; 70 miles N.N.E. of Jamfio.

TARGA, a sea-port town of Fev, near which is an oyster fishery; 90 miles S.E. of Tangiers.

TARGA. See TIRGA.

TARGAR, a name given by some of the chemical writers to oil of juniper.

TARGET, a field; thus called from the Latin tergum, back, because originally made of leather, wrought out of the back of an ox’s hide.

TARGET is also the name of a mark for the artillery to fire at in their practice.

TARGET, in Geography, a town of France, in the department of the Allier; 2 miles S.E. of Montmarault.

TARGONI, TOZZETTI, GIOVANNI, in Biography, an eminent Italian physician, was born at Florence in 1712, and took his degree of M.D. at Pisa, where he had studied and acquired singular reputation. Upon his return to Florence, he applied to the study of botany under the celebrated Micheli, who, at his death, bequeathed to him his library, herbarium, and MSS., and also the successor to his directorship of the botanical garden. He was likewise nominated professor of botany in the Florentine college by the grand duke; and admitted to the two academies of the Apatifi and Della Cruca. In conjunction with Cocchi, he engaged in making a catalogue of the library of Maghiabecchi, which he had bequeathed to the public; and incompence of his labour, the grand duke appointed him librarian. His various occupations, in connection with his practice, rendered it necessary for him to resign the office of director of the botanical garden in 1749. The mind of Targioni, however, was so active, that not content with his literary and professional employments at home, he made several scientific excursions, the result of which he published in his “Relazioni d’alcuni Viaggi fatti in diverse parti della Toscana per osservar le Produzioni naturali, e gli antichi Monumenti d’effe,” Firenze. 1751, 8vo. As a physician, he also published several pieces, and among these were “Directions for the Recovery of drowned Perfons.” He also promoted inoculation for the small-pox; and directed his attention to the treatment of epidemics, the draining of marshes, the prevention of the inundations of the Arno, and the examination of vegetables to be substituted for bread in a time of scarcity. Having taken leave of literary labours by a work on the progress of the physical sciences in Tuscany, comprised in four volumes, he restricted himself to medical practice from the year 1770 to 1780. At length, in January 1782, being in his 71st year, his life terminated by a gradual decay. Haller. Gen. Biog.

TARGONIA, in Botany, was so named by Micheli, in honour of his friend and fellow-labourer in the natural history of Italy and other parts of the world, Dr. Cyprian Targioni, of Florence, whose valuable museum he highly celebrates. There have been several persons of this name, distinguished at Florence, in medicine and natural history. John Targioni, who took the surname of Tozzetti for an estate, was professor of botany there, and died in 1782, aged 70. He published Travels in Tuscany, as well as several other works relating to natural science, and purchased the museum and library of Micheli. (See that article.)—Mich. Nov. Gen. 3. 3. 5. Linn. Gen. 155. Schreb. 764. Mart. Mill. Dict. v. 4. Sprengel in Stockholl Transf. for 1802. 85. 1. 4; also in Bulletin des Sciences. 27. 1. 2. f. 2. July 8. Lamarck Illutr. t. 877. Clafs and order, Cryptogamia Hepaticae. Nat. Ord. Alge, Linn. Hepaticae, Julf.

Gen. Ch. Cal. ? Perianth a continued membrane, finely reticulated, enveloping the pellif, at length burfting. Stam. ? Anthers numerous, roundish, sessile, scattered over the inside of the perianth. Pfif. Germin oval, nearly sessile, accompanied at the base by the rudiments of others, with abortive styles; style terminal, awl-shaped, tubular, deciduous; stigma concave. Peric. Capsule sessile, nearly globose, of two hemispherical valves, burfting vertically, and one cell. Seeds very numerous, minute, roundifh, connected by five threads into a dense globular mass.

Eff. Ch. Capsule globose, of two concave valves, and one cell. Seeds numerous, combined by fibres into a globe.

1. T. hypophylla. Dotted Targionia. Linn. Sp. Pl. 1803. Hudif. 519. Engl. Bot. t. 287. Dickf. Dr. Pl. 20. (T. minima et vulgaris; Mich. n. i. Lichen petraeus minimus, fructo orobi; Dill. Mufc. 532. t. 78. f. 9. L. alter acacalis ist. foliolum. — Column. Ecphr. part 1. 333. t. 331.)—Very common in heathy rather moist places, among mosses, on old walls and rocks, in most parts of Italy. It is said also to have been found in Devonshire, and in Scotland. We have here living plants from a bank near Nayland in Suffolk, where the Targionia was discovered by the Rev. Mr. Kirby. The fronds are oblong, inversely heart-shaped, three quarters of an inch in length, growing nearly horizontally, in dense imbricated patches, attached by copious fine fibrous roots; their upper surface dark green, marked with a slight longitudinal furrow, and besprinkled with pale prominent points; the under side black, becoming visible when, by drought, the margins are curled in. The parts of the flower we have not seen. The fruit stands at the back of the frond, a little below the end, and looks like the feed of a vetch, being nearly globular, of a very dark brown, almost black; separating when ripe into two hemispherical valves, enclosing a globular mass of black powdery seeds, connected by fibres. The habit of the plant is exactly like that of a Marchantia, (see that article,) but the generic character differs essentially, by the fruit alone, from that genus, as well as from Jungermannia, of which latter Hedwig suspected it to be a species. We rely on the observations of Sprengel for the structure of the flower, though without any solid conviction that the anthers are what he describes. The female parts of fructification resemble those of true Musci, (see that article,) but the capsule is totally different. This part is called calyx in the English Botany, from a supposed analogy to Sphaerocarpus, which we now believe to have little foundation. Whether there be any membrane extended from the base of the style over the germin, like the calyptra of mosses, does not appear from Sprengel’s description, but it is highly probable; though as he expressly says the style itself is deciduous, that circumstance would still afford a material distinction.

TARGON, in Geography, a town of France, in the department of the Gironde; 6 miles N.E. of Cadillac.

TARGOWISKA, a town of Poland, in Volhynia; 9 miles S. of Lucko.

TARGUM, in the Sacred Literature, a name which the Jews give to their Chaldee glosses and paraphrases on the Scripture. See PARAPHRASE.

These Chaldee paraphrases, which were translations of the Scriptures of the Old Testament, from the Hebrew text into the language of the Chaldeans, were called Targums: for the word targum signifies in Chaldee an interpretation or version of one language into another, and may properly be applied to any such version or translation; but it is most commonly by the Jews appropriated to these Chaldee paraphrases by way of eminence.

A.
As the Jews, during their long captivity in Babylon, had
forgotten their ancient language, the Hebrew; and now under-
stood nothing but the language of their masters, the Chal-
dees; there was a necessity of explaining the prophets in
that language; and to this necessity is owing the first begin-
ning of the Chaldee paraphrase.

To make the sense of the text understood, each doctor
made a paraphrase of some part of it in the vulgar tongue;
and as the several interpretations, in time, became very
voluminous, certain rabbins undertook to collect them to-
gether; and this collection they called "The Targum.

The Jewish doctors do not agree about the antiquity of
the Targum; for the more modern Jews having blended
their own comments with those of the ancients, no certain
age or era can be fixed for the whole work.

It is commonly believed, that R. Jonathan, who lived
under the reign of Herod the Great, made the first Chaldee
version of the prophets; and with this version mixed the
interpretations borrowed from tradition. Onkelos, it is
certain, translated the Pentateuch almost word for word;
and without any paraphrase; and another version of the
Pentateuch is ascribed to Jonathan, but that without much
certainty.

Dr. Prideaux thinks, that the version or Targum of
Onkelos is the most ancient of all that are now extant: and
the principal reason of his adopting this opinion is, that
the style in which it is written approaches nearer to the
style of that part of Daniel and Ezra, which is written in
the Chaldee language, and which may be considered as a
standard of its purity, more than any other. This Targum
has been held in higher esteem among the Jews than all
the other Targums, and being left to the fame musical
notes with the Hebrew text, it is thereby made capable of
being read in the same tone in their public assemblies. The
next to this in the purity of its style, is the Targum of
R. Jonathan Ben Uzziel on the prophets; that is, on
Joshua, Judges, the two books of Samuel, the two books
of Kings, Isaiah, Jeremiah, Ezekiel, and the twelve minor
prophets. The Targum of Onkelos is a strict version,
rendering the Hebrew word for word; whereas Jonathan
takes the liberty of a paraphrase, by enlargements and addi-
tions to the text. The third Targum, or that on the law,
ascribed to Jonathan, is not his, because the style of it is
wholly different from that of his true Targum on the
prophets, and several things are mentioned in it, which had
no being, or at least no name, till after Jonathan's time.
The fourth Targum is on the law, written by an unknown
author, and at an unknown period. It is called the Jeru-
salem Targum, probably because it was written in the Jerusalem
dialect, which was spoken by the Jews after their return
from Babylon, and which contains a mixture of Hebrew
words with the Chaldee. This Jerusalem Targum is not a
continued paraphrase, as all the rest are, but confined to
select passages, as the author seems to have thought the text
most wanted an explanation. In many places it is taken
word for word from the Targum, said to be Jonathan's on
the law; and contains several things, which are delivered in
the same words in the New Testament by Christ and his
apostles. Dr. Prideaux accounts for this circumstance, by
supposing that these were sayings and paraphrases, which
had obtained among the Jews in the time of our Saviour,
and continued among them long after; and hence Christ
and his apostles, and afterward the author of this Targum, de-

erived them from the same source. The fifth Targum, which
is that on the Megilloth, i.e. Ruth, Esther, Ecclesiastes,
Solomon's Song, and Jeremiah's Lamentations; the sixth,
which is the second Targum on Esther; and the seventh,
which is that on Job, the Psalms, and the Proverbs, are all
written in the most corrupt Chaldee of the Jerusalem dialect.
Of the two former, no author is named; but the author of the
third is said to be Joseph the one-eyed, but who he was,
or when he lived, we are not told; that on the Megilloth,
which mentions the Mifheha and the Talmud with the explica-
tion, must have been written after the Babylonish Talmud,
or the year of Christ 500. The eighth and last of these
Targums, is that on the two books of Chronicles; pub-
lished by Beckius at Augsburg in Germany, that on the
first book in 1680, and that on the second in 1683. On
Ezra, Nehemiah, and Daniel, there is no targum.

That the Targum of Onkelos is the law, and that of
Jonathan on the prophets, are as ancient as our Saviour's
time, if not more ancient, is the general opinion of both
Jews and Christians. As to all the other Targums besides
these two, they are certainly of a much later date; the style
of every one of them is more barbarous and impure than
that of the Jerusalem Talmud, and they muft, therefore,
have been written after the compofure of that work, i.e.
the beginning of the fourth century after Christ; and
if the Talmudic fables, with which they abound, were
taken out of the Babylonish Talmud, this will bring their
date still lower, and prove them to have been written after
that Talmud, or after the beginning of the fifth century
after Christ.

The Targums of Onkelos and Jonathan are in such great
esteem among the Jews, that they hold them to be of the
fame authority with the original sacred text, and for the sup-
port of this opinion, they feign them to be derived from
the fame fountain. The Chaldee paraphrase of Onkelos,
they say, was delivered in the fame manner with the real
law, when God gave the written law unto Moses at Mount
Sinai; and when by his holy Spirit he dictated to the pro-
phets the prophetical books, he delivered severally to them
upon each book the Targum of Jonathan at the fame time.
These were delivered by faithful hands, the first from
Moses, and the other from the prophets, till they came
down to Onkelos and Jonathan, who only put them into
writing.

Agreeably to the high opinion that was entertained of
them, they were read every Sabbath-day in their synagogues,
in the fame manner as the original sacred word itself, of
which they were versions; and this use of them was con-
tinued to late times. Whether the Targums of Onkelos
and Jonathan were received for this use so early as our
Saviour's time is not certain; however, it seems that these,
or some others, were used for the instruction of the people,
and were read among them in private as well as in public.
Agreeably to this purpose, they had some of their bibles
written out in Hebrew and Chaldee together; that is, each
verse first in Hebrew, and then in Chaldee; and thus from
verse to verse through the whole volume. In these bibles,
the Targum of Onkelos was the Chaldee version for the
law; and that of Jonathan for the prophets; and for the
Hagiographa, the other Targums that were written on
them. One of these bibles, thus written, Buxtorf tells us
he had seen at Strasburg: and bishop Walton acquaints us,
that he had the perusal of two others of the same fort, one
in the public library of the church of Weitminster, and the
other in the private study of Mr. Thomas Gataker. The
other Targums are all of a much later date than those of
Onkelos and Jonathan, and of far less authority: however,
bishop Walton has introduced most of them into his Poly-
glot. The Targums of Onkelos and Jonathan are of great
use for the better understanding not only of the Old Testa-
ment, on which they are written, but also of the New. As to
the
the Old Testament, they serve to vindicate the genuineness of
the present Hebrew text, by proving it to be the same that
was in use when these Targums were made, contrary to the
opinion of those who think the Jews corrupted it after our
Saviour's time. They help to explain many words and
phrases in the Hebrew original, and they hand down to us
many of the ancient customs of the Jews. And some of
these, with the paraphrases, idioms, and peculiar forms of
speech, which we find in them, do in many instances help
as much for the better illustration and better understanding
of the New Testament as of the Old: the Jerusalem Chal-
dee dialect, in which they are written, being the vulgar lan-
guage of the Jews in our Saviour's time. They also very
much serve the Christian cause against the Jews by inter-
preting many of the prophecies of the Messiah in the Old
Testament, in the same manner as the Christians do. Many
instances are produced to this purpose by Dr. Prideaux in
his Connect. of the Hist. of the Old and New Test. vol. iv.
p. 777, &c.

These Targums are published to the best advantage in the
second edition of the great Hebrew bible set forth at Basil
by Buxtordt the father, anno 1610, for he has rectified the
Chaldee text, and reformed the vowel pointings in it: the
Targums having at first been written without vowel points,
which were afterwards added very erroneously by some
Jews.

TARHONA, in Geography, a town of Africa, in Tri-
poli; 25 miles S.W. of Leibda.

TARI, or Torn, a river of Africa, which runs through
the kingdom of Popo into the sea.

TARI, in Commerce. See TARO.

TARICHLÉ, in Ancient Geography, islands situated on
the coast of Africa, in the Mediterranean sea, between
Leptis and Thaphius, mentioned by Strabo.

TARIDEGO, in Geography, a town of Africa, on the
river St. Domingo. N. lat. 12° 16'. W. long. 13° 56'.

TARIENTÔ, a town of Italy, in Friulli; 8 miles N.
of Udina.

TARIER of Buffon, in Ornithology. See MOTACILLA
Rubra.

TARIERA, in Ichthyology, the name of a river-fish
cought in many parts of America.

It is an oblong fish, with a straight back, and a belly
somewhat hanging down; its under jaw is longer than its
upper, and its teeth are extremely sharp: among these are
two longer than the rest in the middle of the under jaw, and
four fuch in the upper; its scales are large, its back brown,
and its belly and sides whitish. It is a well-tafted fish, but
full of bones. Margrave.

TARIF, or TARIFF, Book of Rates; a table or cata-
logue, drawn usually in alphabetical order, containing the
names of several kinds of merchandise, with the duties or
customs to be paid for the same, as settled by authority, and
agreed on between the several princes and states, that hold
commerce together.

TARIFFA, in Geography, a sea-port town of Spain,
in the province of Seville, situated on a bay to which it
gives name, on the north side of the Straits of Gibraltar,
fortified with old walls and towers, with a castle, in which
the governor resides. By the Romans it was called "Julia
Traducia," and "Julia Zoja." The present name is from the
Moors; 27 miles S.S.E. of Medina Sidonia. N. lat.
36° 3'. W. long. 5° 41'.

TARIFILON, in Botany, a name by which Avicenna,
and some other authors, have called the trifolium bistaminum,
or flinking trefoil.

TARIFA, in Geography, a jurisdiction of South Ame-
rica, in Peru, but placed under the viceroyalty of Buenos
Aires. This is represented a charming and fertile country,
with a ferene sky and a fine temperature of air, producing
wheat, maize, and all other things that are essential to the
support of man; together with the tree, which produces
the herb of Paraguay, the coca, the vine, and flax, which
is cultivated merely for the sake of its seed. In the abun-
dance of pastures are fed a vast number of cattle and sheep.
The annual transports of black cattle alone are computed
at little less than 10,000 head, which are valued at from
eight to ten piastras each. The hides tanned and prepared
for leather for the inhabitants of La Plata, Potosi, &c. The demands for Spanish and colonial merchandise an-
nually exceed 60,000 piastras; the returns for which are
made in productions of the province. St. Bernardo de
Tarija is the chief town. Chicas and Tarija form one
government.

TARIJA, a river of South America, which runs into
the Vermejo, in the province of Tucuman.

TARIJA. See St. Bernardo de Tarija.

TARIN, in Ornithology, a name given by the French,
and from them by many others, to the citrinella; a bird com-
mon in Italy, and kept in cages for its beauty and fine notes.
See FRINGILLA.

TARINGASONG, in Geography, a town of Thibet;
17 miles S.S.E. of Lafia. N. lat. 28° 7'. E. long. 93°.

TARINGTING, in Ornithology, a name given by the
people of the Philippine islands, to a species of lapwing,
which is common on the seashores, and runs remarkably
swift.

TARINURAK, in Geography, a river of Russia, which
runs into the Lena. N. lat. 61°. E. long. 124° 14'.

TARISKERI, a town of the island of Melolin, on the
n. coast; 12 miles E. of Cape Sigrs.

TARIT, one of the many names given by chemists to
mercury.

TARITO, in Geography, a town of Thibet; 33 miles
S.E. of Tchontori.

TARKA, a mountain of Transylvania; 28 miles N.N.E.
of Udvorhely.

TARKI, a town of Hungary; 15 miles N.N.W. of
Topoltzen.

TARK, or Tarku, a town of Asia, in Daghestan, capi-
tal of the district of Schangul, seated in N. lat. 42° 56',
and supposed to contain 10,000 inhabitants, stands on the
Caspian shore, in a narrow glen, through which run many
streams of salt-water.

TARKIRA-HOUTCHIN, a port of Chinefe Tartary,
in the country of the Monguls. N. lat. 44° 34'. E. long.
113° 48'.

TARCO, a town of Hungary, 6 miles E.S.E. of
Szeben.

TARKSHA, a name of the fabulous bird Garuda, on
which, in the mythology of the Hindoos, their god Vishnu
rides. This vehicle, or vahan, in the Sanscrit tongue, is
represented as half man half eagle; and offers an argument
for the identity of the Hindoo deity, and the Jupiter of the
Greeks. Another name of this bird is Superna; which fee.
See also VAHAN.

TARMA, in Geography, a jurisdiction of South America,
in Peru, situated to the north of Atun Xauxa, about 90
miles from Lima, to which diocese it belongs; is one of
the most extensive in this part of Peru. The climate is
temperate, and the soil fertile, except towards the mountains,
where it is cold, and the land is chiefly applied to feeding
of cattle; and many mines of silver are found. Tarma, the
capital,
capital, is 85 miles E. of Lima. S. lat. 11°. W. long. 75° 50'.

TARONBarry BRIDG, a village of the county of Roscommon, Ireland, at which there is a bridge over the Shannon. The royal canal, if it should ever be completed, is to join the Shannon near this place. It is 4 miles N.W. from Longford, and above 60 from Dublin.

TARON-HILL, a mountain at the southern extremity of the peninsula, called the Mullet, being a detached part of the county of Mayo, Ireland.

TARN, a river of France, which rises in the mountains of Lozére, and flows by Florac, Ifpanac, St. Enimie, Compeyre, Millau, St. Roman, Alby, L'Ile, Rabaffens, Villefranche, Montauban, &c. and joins the Garonne, near Moissac, in the department of the Lot.

TARN, a department of France, being one of the nine departments of the southern region, and formerly a portion of Upper Languedoc, in N. lat. 43° 40', bounded on the N. and E. by the department of the Averon, on the S.E. by that of Herault, on the S. by that of the Aude, and on the W. by the departments of the Upper Garonne and the Lot, and taking its name from the river Tarn, which traverses it from E. to W. Its territorial extent is 6800 square miles, and its population comprehends 272,163 persons. It is divided into 4 cantons, 15 communes, and 356 communes. The circles are Gallic, including 59,001 inhabitants; Alby, 63,064; Castres, 106,918; and Lavaur, 42,380 inhabitants. Its contributions in the 11th year of the French era, amounted to 2,603,820 francs; and its expenses to 225,748 fr. 18. cents. According to Haffenfratz, its extent in French leagues is 30 in length, and 20 in breadth: it is divided into 5 etoilles and 48 cantons, and its population comprehends 289,148 souls. Its capital is Alby. This department is diversified with hills and plains, and abounds in a variety of productions, viz., grain, flax, hemp, wine, fruits, and Pastures. It has considerable forests, with mines of iron, copper, lead, coal, quarries of marble, &c.

TARNA, a town in Sweden, in the lapmark of Umea; 142 miles N.W. of Umea.

TARNAC, a town of France, in the department of the Correze, on the Vienne; 25 miles N. of Tulle.

TARNAVOS, a town of Hindostan, in the county of Calicut; 20 miles N.E. of Paniyam.

TARNISHING, a diminution of the natural lustre of any thing, especially of a metal.

Gold and silver, when tarnished, resume their brightnes, by letting them over the fire in certain leys. Copper, pewter, &c. that are tarnished, recover their lustre with tripoli and potashes.

TARNOGROD, in Geography, a town of Poland, in the pataline of Belz; 52 miles W.S.W. of Belz.

TARNOPOI, a town of Austrian Poland, in Galicia; 72 miles E. of Lemberg. N. lat. 49° 30'. E. long. 23° 40'.

TARNOW, a town of Austrian Poland, in Galicia; 52 miles S.W. of Sandomir. N. lat. 49° 56'. E. long. 23° 55'.

TARNOWITZ, a town of Silesia, in the principality of Oppeln, near which is a river mine; 6 miles N. of Ober Beuthen. N. lat. 49° 25'. E. long. 18° 47'.

TARO, a river which rises in the southern part of the duchy of Parma, and runs into the Po, 9 miles E. of Buffeto. The country through which it passes is called Val di Taro.—Alfo, a late department of France, formed by the duchies of Placentia and Pavia.

TARO, in Commerce, a money of account and copper coin of Naples, Sicily, and Malta. For the accounts at Malta, see Scudo. The banks at Naples keep their accounts in ducati, tari, and grani. A ducat contains 5 tari, 10 carlini, or 40 cinquini; a tari, or carino, is worth 2 carlini, or 20 grani. Among the silver coins are tari, at 2 carlini. By the coinage of 1804, the piece of 12 carlini should contain 3525 English grains of fine silver; so that it is worth 32d. sterling; and the ducat of 10 carlini is worth 41d. sterling nearly, or 1/16. of an ounce of silver. It is worth 1/16. of a tari, or 1/40. of a carlini.

TAROS, a town of Italy, in the province of Bari, N.W. of Taranto.

TAROTI, in Italian Geography, a town of Italy, in the province of Bari, N.W. of Taranto.

TAROTS, or TIRONS, a town of Peria, in the province of Adirizetian; 12 miles S.E. of Tauris.

TARONA, in Ancient Geography, a town of the Tauric Chersonesus, S.E. of Taplira, and E. of Saratza.

TARONCHI, in Geography, a town of Hindostan, in Mylore; 15 miles S.W. of Chima Balabam.

TAROUCHI, in Geography, a town of Hindostan, in Buri; 9 miles S. of Oameo.

TAROUDA, a town on the coast of the island of Tidor. N. lat. 3° 42'. E. long. 127° 20'.

TAROUSA, a town of Hindostan, in Berar; 30 miles N.E. of Neermul.

TAROUT, a town of Arabia, in the province of Hedsjas; 32 miles S.E. of El Catiff.

TARP, a town of Sweden, in the province of Dalland; 12 miles N. of Uddevalla.

TARPANS, a kind of wild hores in the Caucaan desert, E. of the river Yalik. They are of a middling size, roundish, short, generally of a blue-win-grey colour, with big heads, and ewe-necked. They are taken with a noose, and broken to the bridle by being coupled to a tame horse.

TARPALIIN, or TARPALING, is a piece of canvas, well pitched and tarred over, to cover the hatchways of a ship at sea, in order to prevent the penetration of the rain or lea-water, which may occasionally rush over the decks. The term is also used in derision for a person bred at sea, and educated in the mariner's art. We also, of late, use it to express a painted flour-cloth.

TARPALIN GOWN, in Geography, a bay on the S. of Massachusets, near Falmouth.

TARPEIAN, TARPEUS, in Antiquity, an epitaph given to a rock in ancient Rome, of considerable height; whence, by the law of the Twelve Tables, those guilty of certain crimes were precipitated. It was on this rock that the Capitol was built.

The Tarpeian rock might formerly be steep enough on one side to break a man's neck; but it could never have been of that surpassing height mentioned by some writers, if any judgment can be formed from its appearance at present. See Burnet's Letters, p. 238, and Mifion's N. Voyage, p. 103.

It took its name from a vault, called Tarpeia, who betrayed the Capitol, of which her father was governor, to the Sabines; on condition that they would give her all they bore
bore on their left arms, meaning their bracelets. But, instead of bracelets, they threw their bucklers (which were likewise borne on their left arm) upon her head, and crushed her to death.

Others ascribe the delivery of the Capitol to her father, Spurius Tarpeius; and add, that he was precipitated down this rock by Romulus's order, and that this hencedeflow became the punishment of all criminals of the like kind.

TARPEIAN GAMES, Ludi Tarpeini, were games instituted by Romulus in honour of Jupiter Feretrius; and called also Capitolini ludii. See CapitoLINE.

TARPORLEY, in Geography, a small market-town in the hundred of Edisbury, and county palatine of Chelfter, England, is situated on the great road from London to Chelfter, at the distance of 172 miles N.W. from the former, and 11 miles E.S.E. from the latter. In ancient records, Tarporley is called a borough, and the houses bargages; it had in former times a mayor, as appears by deeds of the years 1348 and 1396; it is now governed by a constable. The market, which was originally on Tuesday, was granted in 1281 to Hugh de Tarporley, then lord of the manor; it had been many years defused, but was restored in 1735 by Sir John Crew, who also procured a grant of three annual fairs, and built a market-house. The parish of Tarporley, which includes the townships of Eaton, Rudhton, and Utikinton, contained in the year 1811, according to the population report, 365 houses, and 1852 inhabitants. An annual fox-hunt, of great celebrity, is held at Tarporley, on the first week in November, during which week are horse-races, at a place called Crabtree Green, on Delamere forest.

About two miles southward of Tarporley rises the great inflated rock of Beehton, it is composed of sand-flone, and is nearly perpendicular on one side, which gives it a tremendous appearance, but the other side gradually slopes to the level of the country. Its height is 366 feet. On the crest of this rock are the flately ruins of the far-famed Beehton castle, whose almost impregnable strength was once proverbial. This fortress was erected in 1220 by Ranulph de Blundeville, earl of Chelfter. It consisted of an outer and inner area. The outer was defended by a strong wall, fortified with round towers, which ran across the slope from one end of the precipice to the other. Some parts of this wall, and six of the towers, are still extant. The area inclosed is nearly five acres. The castle was defended, on one side of the area, by a deep ditch cut out of the solid rock; on the other, by the abrupt precipice that overhangs the vale of Cheshire. The entrance is through a noble gateway, guarded on each side by a great round tower, with walls of prodigious thickness. During the civil wars of the 17th century, this forest was alternately besieged by the royal and parliamentary forces; and in 1646 was dismantled by order of the parliament.—Lyfons's Magna Britannia, vol. ii. part 2. Chelfter. Beauties of England and Wales, vol. ii. Chelfter, by J. Britton and E. W. Bralysey.

TARPOU, a lake of Tibet, about 60 miles in circumference. N. lat. 30° 32'. W. long. 81° 54'.

TARQUINIUS PRISCUS, Tarquin the Ancient, in Biography, the fifth king of Rome, was the son of an opulent merchant of Corinth, who, escaping from tyranny at home, settled at Tarquini, in Eturia, where he married a female of rank, by whom he had two sons. One of them died, and the other, named Lucumo, was urged by his wife Tanaquil, a lady of rank and of ambition, to remove from Eturia to Rome; where he changed his phonomen Lucumo into Lucius, and his family name Damaturus into Tarquinius, borrowed from his native city. Here he ingratiated him-
as chief member of the confederation, preceding at the sacrifices and deliberations. This institution contributed to the strength of the Roman state, and the extension of its dominion throughout Italy. Having taken up arms against the Volscians and Sabines, he returned, after a successful war, to Rome, and twice triumphed; and he took occasion to finish the great circus and the fewers, which his grandfather had begun. But a war again commenced with those discontented patricians, who had taken refuge at Gabii, a Latin city not far from Rome; and this war lasted seven years. At length Gabii was conquered by the treachery of Sextus, one of Tarquin's sons; and the inhabitants, whom he treated with lenity, were incorporated with the Romans. During the reign of this Tarquin, the Sibylline books were brought to Rome, as we have related under that article, and the Capitolian temple finished. Ardea, the capital of the Rutuli, was the next object of Tarquin's military enterprise; and this circumstance was the remote cause of the rape of Lucretia by Sextus Tarquin, which at length occasioned the expulsion of the Tarquinian family from Rome, as well as the extinction of the kingly government. Brutus, availing himself of the passions excited among the multitude by the tragic fate of Lucretia, and expelling the tyrannical government under which Rome groaned, obtained a public decrees for the banishment of Tarquin and his sons, and the army concurring in this resolution, the king was reduced to the necessity, at the age of 76, B.C. 579, to abandon his capital, and take refuge at Caere, in Etruria. Many attempts were made for his restoration, but all proved ineffectual. Tarquin retired into Campania, and died there, in the 90th year of his age, and 44th of his exile. Poffeiting talents fit for command, he was nevertheless violent, cruel, and wholly unprincipled. Univ. Hist. Gen. Biog.

TARRA, in Ancient Geography, a town of Asia Minor, in Lydia.—Alfo, a town and mountain of Crete.

TARRABERRY, in Geography, a town of Bengal; 30 miles N. of Dinajopoulos.

TARRABOGA, a town of Bengal; 45 miles S. of Dofa.

TARRACE, TARRASS, Tarrace, or Terras, a coarse fort of piaffer, or mortar, durable in the wet, and chiefly used to line baths, cisterns, wells, and other refervoirs of water. See Calcareous Cement.

That which is called the Dutch terras, is made of a soft rock-flone, found near Colleen, upon the lower part of the Rhine; it is burnt like lime, and afterwards reduced to powder by means of mills: from thence it is brought to Holland in great quantities, where it has acquired the name of Dutch terras. It is of a greyish colour when it is not mixt, which is very seldom the cafe: because it is very dear, and the demand for it in aquatic works very great. It is said that in some parts of England there is found a soft flone, resembling that of Dutch terras, and which might serve as well in aquatic works.

An artificial terras, resembling the true, may be formed of two parts of lime, and one of piaffer of Paris, well beaten together, and used immediately. There is another fort of terras, used for coarser uses, which is sometimes called Welsh terras, formed of one part lime, and two parts of well-lifted coal-ashes, thoroughly mixt by being well beaten together. Handm. to the Arts, vol. ii. p. 32.

TARRACO, in Ancient Geography, a town of Hispance Citerior, belonging to the Coetian. This was an ancient town in the time of the Romans. Some Spanifh authors have attributed its foundation to Tubal. Others, with greater probability, ascribe it to the Phenicians, who called it Tarco, which the Romans changed into Tarraco. Having been destroyed, it was re-established by the two Scipios. At length it became the capital of that region, to which it gave the name of Hispana Tarragonensis. Augustus visited this city on occasion of his war against the Caffarbi; and it was here that the first altar was errected to his honour. Galba, A.D. 68, was prosecuted by the Tarragonians with a crown of gold. It was in the year 121 or 122 that Adrian re-established the temple built in this city in honour of Augustus, under the reign of Tibers. See TARRAGON.

TARRAGON, in Botany, a name sometimes given to Juniperus communis; which see. See also Artemisia.

TARRAGONA, in Geography, a town of Spain, in the province of Catalonia, situated on a rising ground on the coast of the Mediterranean, at the mouth of the river Fraioli, and one of the most ancient cities in Spain, said to have been founded by the Phenicians. Under the Romans it was the capital of a province, called Tarragonensis, and was fortified by Scipio as a defence against the Carthaginians. In the year 467 it was taken by the Goths, and levelled with the ground. In 516, a council was held here, in which monks are first mentioned; when it was ordained that the Sabbath should commence on Saturday evening. It afterwards fell into the hands of the Moors, from whom it was recovered in the latter part of the 11th century, and rebuilt by the archbishop of Toledo, who was by the pope abfolved of the oath he had taken of going to the holy war, on condition that he would lay out the sum designed for that expedition in rebuilding Tarragona. In the war of the succession, the English obtained possession of this city, and intended to keep and fortify it, by bringing the river Francoli quite round it; and for this purpose threw up at first outworks and redoubts, the ruins of which are yet visible. On the possession of Gibraltar, they gave up the design. The environs at Campus Tarragonensis they select one of the most fertile spots in Europe. Tarragona has but few remains of its ancient grandeur; inscriptions almost destroyed by time, some coins, and a few ruins, give but an imperfect idea of what it formerly was. It is now depopulated, and of little importance. The harbour is dangerous, and not much frequented; there are a few bollions in bad repair, which were formerly built for its defence. Tarragona is, however, the seat of an archbishop, the metropolis of Catalonia, and disputes with Toledo the primacy of Spain. The establishment of the see is said to have been in the first ages of the church; the succession of archbishops was interrupted by the Moors, and remained suspended until the 11th century. The cathedral is worthy of attention for its vast dimensions, the elegance of its Gothic architecture, and a magnificent chapel, built with rich marble and jasper, in honour of St. Thecla, titular saint of the church; 98 miles E.S.E. of Saragossa. N. lat. 41° 8'. E. long. 10° 33'.

TARRAGUNGE, a town of Bengal; 22 miles S.E. of Moorhedabad.

TARAPOUR, a town of Hindooflan, in Bengal; 17 miles S.W. of Bogipour.—Alfo, a town of Hindooftan, in Malwa, on the Nerbaddah; 12 miles S. of Mundu.

TARRAR, a cirque of Hindooftan, in Allahabad, bounded on the north by Allahabad Proper, on the E. by Chunar, on the south-east by Bogickleund, and on the west by Bundeleund; about 35 miles long, and 12 broad.

TARRASA, a town of Spain, in Catalonia; 13 miles N. of Barcelona.

TARRATZ POINT, a cape on the north coast of St. Vincent, N. lat. 13° 24'. W. long. 65° 15'.

TARREGA, a town of Spain, in Catalonia, on the

Cervera;
TAR

TARROCK, in Ornithology, the name of a sea-fowl of the larus or gull-kind, and distinguished by authors by the name of the larus cicerus Belloni; and called by Linnaeus the Larus tridactylus; which see.

It is of the size of the common pigeon, and is not much unlike it in shape, except that the head is larger and thicker. The bill is black, short, thick, and strong; the throat, neck, and under side are white; near each ear, and under the throat, is a black spot; on the hind part of the neck is a black crescent, with the horns pointing to the throat.

Its great distinction, however, from all the other birds of the gull-kind, is, that it has no hinder toe, but in lieu of it a small protuberance. It is very common on the coasts of Cornwall, and some other of the English shores. Ray and Pennant.

TARRY-TOWN, in Geography, a town of New York, where major Andrew, of the British army, was apprehended as a spy; 24 miles N. of New York.

TARSIS, a town of Hindoostan, in Berar; 18 miles E. of Nagpore.

TARSI, in the Materia Medica, a name by some authors have called the root of the cyperus aculeatus, or sweet cyperus of the shops, and by which it is, in some places, usually called by the druggists. See Avellanda and Habitazis.

TARSO, in the Glass Trade, a sort of white floune found in many rivers in Italy, and other places; and used instead of sand for the finest crystal-glass, being first burnt, and calcined with the salt of the polvere into frit. Neri's Art of Glasses, p. 7.

Neri calls this floune a kind of white marble; and adds a general rule, that all flounes that will strike fire with fleel, are fit to vitrify; and those that will not strike fire with fleel, will never vitrify.

The criteria or determinate characters of fossils were not at all fixed in this author's time, otherwise he had not called this floune a kind of marble; since his own general rule of trying flounes by fleel is, though liable to a few exceptions, a very good one; and, according to that, this tarso could be of no affinity to marble; for marble will not strike fire with fleel, nor ever be converted into glass.

The tarso, therefore, of this and other authors, could be nothing of the marble kind; but is truly a crystalline matter debased by an admixture of white earth, and found in form of small pebbles, of a whitish, yellowish, or pale reddish colour; and this is common in all the gravel-pits of England, and in the beds of some of our rivers; and might be used with great advantage by our glass-makers, if they knew it was so easily to be had.

On comparing these flounes of ours, with the cuogoli, or tarso of the foreign glass-makers, there is no difference distinguishable to the eye, nor will the nice experiments by the fire, acid menfrna, &c. shew the least distinction between them. We are not to wonder, however, that the glass-makers did not hitherto distinguish this to be the true cuogoli, or tarso, since the characters of fossils have been hitherto so little ascertained, that the bell and latef author on these subjects, Dr. Woodward, so far mislook the structure of this floune, as to call it a sparre pebble. It is certain that spar could never have any thing to do with glass-making; but this floune has no spar in its composition.

TARSUS, in Ancient Geography, a town and country of Asia, in Bithynia. Steph. Byz.

TARSUS, in Geography, a sea-port town of Aetid Turkey, in the government of Marash, said to have been founded by Sardanapalus. It was at one time the capital of Cilicia, and traversed by the river Cydnus. It is mentioned by Dionysius Periegetes, Ptolemy, Mela, Pliny, and Strabo, the latter of whom says, that it was very powerful and populous; that its inhabitants excelled in the kind of philosophy, and all the sciences cultivated among the Greeks; in this respect they surpassed Athens, Alexandria, and all other academies in the world. It is now inhabited by Turks, Greeks, and Armenians, and is the see of a Jacobite bishop and Nellorian archbishop. It is large, and surrounded with a double wall. St. Paul called himself a native of Tarsus; and here the emperor Julian was buried. It has been said that in the time of St. Paul, Tarsus was a Roman colony, and that the apostle was a citizen of Rome by virtue of his nativity at Tarsus. (Acts, xxi. 37—39. ch. xxii. 3.) But Dr. Lardner has particularly examined this point, and alleged several arguments to prove, that Tarsus, though it was no mean city, as St. Luke says, was not a municipality, or town of Roman citizens. (See St. Paul.) Tarsus was taken by the Saracens in 640; 25 miles W. of Adana. N. lat. 37° 1'. E. long. 34° 37'.

TARSUS, in Anatomy, that part of the foot (confisting of about its posterior half) to which the leg is articulated. Its front portion corresponds to the instep in common language. See Extremities.

The fame name is applied to the portion of cartilage contained in each eyelid. See Eye.

TARTAGLIA, NICHOLAS, in Biography, a celebrated mathematician, was born at Brescia about the beginning of the 16th century. Being left desolate in his childhood by the death of his father, he was no less unfortunate at the siege of Brescia in 1512, in receiving several wounds, and particularly one which divided his lip, so that he lost the power of distinct articulation: and from this circumstance he got the name of Tartaglia. The defects of his early education were amply compensated by his genius and diligence. Having resided ten years at Verona, he afterwards, &c. in 1534, became professor of the mathematics at Venice; and here, except during an interval of eighteen months at Brescia, he remained till the time of his death in 1557. His works are numerous. Besides translations of Archimedes and Euclid, he wrote many original treatises in mathematics, one of the most important of which, entitled "Quelci e' inventione diversi," was published at Venice in 1546, and dedicated to Henry VIII. of England. It is comprehended in nine books, and contains answers to several questions that were proposed to him at different times concerning mechanics, hydrostatics, &c.; and more particularly worthy of notice is the history of the invention of the rules for solving cubic equations, which he communicated to Cardan, under an oath that he would keep the secret. (See Algebra and Cardan.) Tartaglia's genius was no less conspicuously displayed in other sciences than in algebra. He treats of artillery and gunnery, and also of the different methods of fortifying towns, besides various mechanical and algebraical questions. He also proposes many questions with regard to the motion of bodies, and the method of measuring distances, in his "Nuova Scienza" and De Numeri e Mefure." To Tartaglia we owe the first discovery of the bell angle, i. e. 45°; as it was then thought, for elevating a piece as to throw a ball or shell to the greatest distance. He also announced a method of raising velfets that were
The formation of the crystals of this tartar on the skull, while the sides of the vessel had none created on them, shews that the skull had a disposition for receiving the crystals more than any other body; and their peculiar brightness proves, that it had some share in their formation.

Tartar consists of a large quantity of extractive matter, scarcely soluble in water, to which it owes its colour, and of a flat, quite white when pure, composed of acid of tartar united to a small portion of potash, less than is required for the saturation of the acid, but which, in this proportion, forms a distinct crystallizable kind of considerable importance in several arts and manufactures.

Tartar is either souble, or red, according to the colour of the wine from which it is produced. That brought from Germany is the best, as being taken out of those monstrous tuns, some of which hold a thousand pipes of wine, so that the fault has time to come to its consequence, which is one of the chief qualities to be regarded in tartar. That of Montpellier is the next in order; then that of Lyons, Paris, &c.

White tartar is preferred to red, and is really better, as containing less of the drofy or earthy part; though both kinds, when purified, are exactly the same. The marks of good tartar of either kind are, its being thick, brittle, brilliant, and but little earthy.

Tartar, in its crude state, is much used as a flux in the assaying of ores. As it contains both alkali and carbonaceous matter, it acts both in affilting the fusion of refractory ores, and in reducing metallic salts and oxides. When heated per fo to redness in close vessels, the extractive matter and the tartareous acid both become charred, and the result is a black alkaline carbonaceous mass. In open vessels the charcoal burns off totally, and at last nothing remains but pure white carbonate of potash. But tartar is for the most part refined, in order to obtain the pure salt; which is called purified tartar, cream of tartar, crystals of tartar, or more accurately, according to the modern nomenclature, aci'dulous tartarite of potash, or supercarbonate of potash, and sometimes with less precision, simply tartar. This salt is purified in large quantities at Venice, and in France near Montpellier, by two different processes, which have been described by Defract et (Journ. Phy. tom. i. p. 67.) and by M. Fizet (Mem. de l'Acad. for 1725), and which we shall here extract from Aikin's dictionary. At Venice the method is as follows: "The crude tartar is first dried in an iron boiler, with a very gentle heat and frequent stirring, that the acid may not be burnt, and is then pounded in iron mortars. The ground tartar is then distributed into wooden tubs, and boiling water poured upon it, which diffuses the salt, and leaves a sediment, which is thrown away. The clear solution is left three days at rest, during which time it deposits brownish crystals of tartar. The mother-liquor from this operation is retained, and is used hot in the frequent process in the first evaporation of the tartar. The brownish crystals of tartar are then put into a copper boiler, with the mother-liquor of former process, and slowly brought to boil, by which a saturated solution of a deep yellow wine-colour is produced. This is clarified in the following way: a workman stands by the side of the copper with a bale of eggs, and a bucket full of finely sifted wood-ashes. He begins with breaking one of the eggs, and putting the white of it only into a bowl; he then brings this up with some of the boiling liquor, and then pours the whole into the boiler: he then slowly pours in a ladleful of the wood-ashes, which hardens, and turns up the liquor from the bottom. A brisk effervescence takes place, and the surface is covered with a red scum, which is carefully taken off with a perforated skimming-dish, and

funk, and other heavy bodies, from the bottom of the sea, and the means by which a person may be enabled to remain a considerable time under water; and to him we owe a treatise on the fogs which indicate changes in the atmosphere. He has likewise furnished us with a large treatise on arithmetic, algebra, and geometry, published at Venice, in folio, in 1556. Tartagbi remarks, that all Tartagbi's works manifest great penetration and acuteness, and that they would claim higher commendation, if the author had paid more attention to his style, and if the editions were more correctly printed. But with all their imperfections and faults, and after all the improvements to which they have led the way, they were justly esteemed at the time when they were written, and they have been useful to those who have in more modern times pursued the same course of study and investigation. Tartagbi. Montucla. Hutton.

Tartagbi is mentioned by Pietro della Valle among great Roman musicians in 1619, and the composer of "Clearco," the first opera that was performed at a public theatre in Rome. For though several musical dramas had been exhibited in the palaces of ambassadors and other great personages in that city, no theatre had been previously opened there for the public at large.

TARTAGLINI, La Rosa, the daughter of Tibaldi, an excellent tenor singer in the service of the emperor at Vienna. She was extremely celebrated for her beauty and agility of voice, and quitted the stage in 1768.

TARTARA, in Geography, a town of Hindostan, in Calcut; 21 miles E. of Panjaay.

TARTAN, in Sea Language, a small coaling vessel navigated in the Mediterranean sea, and having only one mast and a bowsprit, the principal sail, which is extremely large, being extended by a lateen-yard.

When tarts put up a square sail, it is called a fail of fortune.

TARTAR, Tartaros, or Tartarum, in Chemistry, an acid concrete salt which rises from wines, after complete fermentation, andlicking to the top and sides of the casks, forms a crust, which hardens to the consistence of a stone. It is in this flat a hard, brittle, brown-red mass, interspersed with imperfectly crystallized particles, and called crude or rough tartar, or argol, by way of distinction from that which is purified.

Its goodness rather depends on the number of repeated fermentations, which a succession of new wines in the same casks for several years makes, than on the soil or climate where the wine is produced.

The sweet wines afford always less tartar than the sharp ones, and it is also less valuable. The tartar of Rhenish wine is better than that of any other; and in general those wines which have the most acid in them, and which are the most coloured and strongest-bodied, afford the greatest quantity of tartar, and that in the largest crystals.

The taste of tartar is vioceous, and slightly acid. It is not entirely a product of fermentation, for it is contained in the "must," or grape juice, and as it is formed in the process of fermentation, and the production of alcohol. This salt has also been found native, under different combinations, in some other vegetable juices.

Besides the usual way in which tartar is produced, there is a very remarkable account in the Memoirs of the Academy of Sciences at Paris, an. 1737, of its having been found in a more than ordinary beautiful state on a human skull: the discovery was owing to accident, and it was found that there had been lees of wine in the vessel in which the skull had lain ten days in foak.
TARTAR.

and put aside a second portion of ashes is then added, and the effervescence and scum are renewed and treated as before. The whole of this operation is repeated fourteen or fifteen times, after which the liquor becomes quite clear and colourless. The fire is then withdrawn, and the liquor suffered to remain perfectly at rest for three days. On the fourth, a dirty white filmy crust is removed from the surface, and two-thirds of the liquor laded out; the crystals on the sides are then collected by a ladle, and washed in the remaining liquor; they are thus obtained perfectly clean, and require no further preparation than drying on a wicker frame. The crystals from the bottom are still somewhat coloured, and are either sold as an inferior sort, or are refined again with fresh portions of the crude tartar. The liquid that remains in the boiler, after the deposition of the crystals, is a cold saturated solution of tartar, and is employed in the first fissional of the rough tartar.

The method used near Montpellier has been found so convenient and effectual, that it has continued without any material alteration for a century. It is as follows: "The apparatus required for this purpose is, 1st, a large copper boiler; 2d, a stone cistern, larger than the boiler; 3d, a number of glazed earthen pots (generally twenty-seven), which, together, hold somewhat more than the boiler; 4th, some flammers of coarse cloth stretched on wooden frames; 5th, four smaller copper boilers, which, together, hold as much as the larger boiler, and are used in the refining part of the process; and 6th, a mill to grind the tartar.

The large copper is first filled with two-thirds of mother-liquor, remaining from the previous operations, and one-third of spring-water; a quantity of rough tartar is then thrown in, and, when the liquor is saturated and boiling, it is strained into the earthen pots. In about half an hour the liquor in these pots, though till very hot, begins to deposit crystals on the surface and sides of the pot; during which time, more liquor and tartar are thrown into the large copper, as at first.

The liquor in the pots is then emptied into the stone cistern, leaving the crystallized crust of tartar behind; and when the second boiling is saturated, the pots are again filled as before, and the large copper again charged with the clear liquor from the cistern, and fresh tartar. By thus five times alternately preparing a hot saturated soltion, and allowing it partially to deposit its tartar in the pots, the latter become lined to a considerable thickness with a crust of reddish-white tartar, much purer than at first, and which obviously consists of an irregular crystallized fine mafs, and when washed with cold water, is fit for the second or proper refining process. For this purpose the four small boilers are filled with water, in which a small quantity of clay is diffused, which renders it milky, rejecting the stony and larger particles of earth. The half-purified tartar is then added in such proportion, that the water, when boiling, shall be sufficient to diffuse all the soluble part, and the ebullition is continued for a quarter of an hour; the fire is then withdrawn, and the liquor allowed to remain at rest till the next day. It is then found covered on the surface with a white hard filmy crust, and a similar crust, but more distinctly crystallized, has condensed on the sides and bottom of the boiler. They are both very pure tartar, the crust on the surface, which is an amorphous mass, is called cream of tartar; and the other, crystals of tartar; but they are indifferently mixed.

The crust is then broken down, and falls to the bottom; and the liquor, which is a clear pale red, is poured off gently into the stone cistern, till it begins to run white, owing to the clay at bottom, which latter portion paffes into a separate vessel. The whole mass of solid tartar left in the boiler is then washed with cold water, till all the foulefs (which is merely superficial) is got out, and the water comes away quite clear; after which the purified tartar is taken out, and dried on roves or in the sun, and is perfectly pure and white. The ordinary rough tartar yields about three-fifths of its weight of the white pure salt. All the residual liquors are employed in subsequent operations, in the way already mentioned."

Schaub says (Annal. de Chim. vix. 61.), that tartar may be purified by simply boiling it with powdered recent charcoal, and thus very white crystals are obtained.

TARTAR, Burnt, a preparation used by glass-manufacturers, and consisting of large lumps of red tartar, burnt or calcined in earthen pans in an open fire, till they have done fizzling: it is of a blackish purple colour. Neer's Art of Glass.

TARTAR, Cream of, Cremor Tartari. See Cream of Tartar, Tartar, sapra, Super-tartate of Potash, under SALTS, and TARTARITES.

Cream of tartar has a febibly acid taste; it reddens the blue colours of vegetables; it may be saturated by uniting with any of those substances, which are capable of forming with acids neutral salts; and it may be afterwards separated from those substanaces, and recover its former appearance.

In the arts, and in the materia medica, this is a very valuable salt. It is much used in dyeing, more especially in giving the scarlet and other modifications of the coelimal colours. It is also often combined with alum, as a mordant in fixing colours. (See DYEING.) As an article of the materia medica, cream of tartar, diffolved in water, forms an agreeable and cheap acidulous drink; and as a sweetener of the blood, some have taken it in whey or water-greal, in the spring-time, to the quantity of half an ounce every morning, for three or four weeks. The solution in water, sweetened with sugar, is a pleasent beverage in febile diathesis, when its purgative quality is not likely to prove injurious. See the next article.

The difficult solubility of cream of tartar being an objection to its medical use, some experiments were made by Dr. Peter Jonas Berg, for rendering it more soluble by certain additions, without altering its medicinal qualities. Borax was found to answer well for this purpose. To four parts of cream of tartar one of borax was added. These were diffolved in a sufficient quantity of water, and the liquor strained; about a sixteenth part of impurities was left behind. The pure solution evaporated yielded an acid, and extremely soluble white salt. Lemery has also recommended borax. It has, however, been observed, that as borax contains an excess of alkalies, the acid of the tartar would be neutralized, and a very different salt would be produced, viz. the tartate of potash and soda; which is a minute. Nova Acta. Phil. Med. Acad. Citz. Leop. Carol. Nat. Curiol. tom. iv.

TARTAR, Crystals of. See Tartar, sapra, and TARTARITES.

These crystals are small and irregular, but generally run together into little mases of a white colour, semi-transparent, brittle, and easily reduced into powder. Crystals of tartar are in common use as a laxative and mild cathartic; they are also esteemed for their cooling and diuretic qualities, and have therefore been much employed in dropies, and in other cases requiring an antiphlogistic treatment. Dr. Cullen says, that in large doses they act like a purgative, in exciting the action of the absorbents in every part of the syftem, and more powerfully than the operation of any entirely neutral salts. On this property is founded their utility in the case of dropy. They occasion a considerable discharge of erous fluid into the bowels, which is thrown off
TARTAR.

in the form of ferous dloths; the discharge by urine being also augmented. The water in the cavity of the abdomen is thus rapidly carried off; and the chance of a return of the dilafoe are supposed to be fewer than when other diuretics are employed. It is remarked, that they do not readily pass off by the kidneys, unless they are taken with a large quantity of water; and, therefore, when intended as a diuretic, they ought to be given in a liquid form, as Dr. Holme has directed. It has been suggested, that, in cafes complicated with hepatic obstructions, the effects of this remedy are very uncertain. It may be advantageously united with fequills; and, on account of the exhaustion which it occasions, the nfe of it should be followed by preparations of ftron, and other tonics. As a purgative and hydroagogue, the dose is from 3½ to 5y, in the form of electiue; and for the latter purpose, this dose must be repeated until the kidneys are affected; diluting freely during its use. These flets enter several official compositions: such as "carbonis potashis purififimus," Ed. Ph.; "ferum tartarizatum," L. D.; "pulvis jalape compofitus," E.; "pulvis fcammonii compofitus," E.; "pulvis fena compofitus," E.; "pota/ae tar/ara," L.E.D.; "antimonium tartarizatum," L.E.D.; "foda tartarizata," L.E.D. Woodville. T. Thonfon.

TARTAR. Emetic. See Antimony.

A considerable diversifiy has occurred in the method of preparing this tartar, probably from want of confidering, that the emetic quality of this preparation proceeds from the metallic earth being difolved by the aid of tartar, and forming with it a kind of folute tartar, a true neutral falt, no lefs capable of a very exact folution than the vegetable falt, the falt of fequills, and all the other folute tartars. By confidering this faturafion as a fixted point, there may be produced only one kind of emetic tartar, always equally strong. See a detail of M. Geoffroy's experiments on this fubjedt, in Mem. Acad. Par. for 1734. M. Beamé directs it to be prepared by mixing together equal parts of cream of tartar, and of porphyriyed glafs of antimony, or rather a larger quantity of the latter ingredient. This mixture is to be thrown gradually into boiling water; and the boiling must be continued gently, till there is no effedvefence, and till the cream of tartar be entirely faturafed. The liquor is to be filtrated; and when it is cooled, there will be formed in it fine cryifals, in the form of pyramids with triangular bafr, which are fable tartar perfeftly faturafed with glafs of antimony. These are transparent while moist; but by excefture to a dry air, they lofe a part of the water of their cryifalization, and become opaque and white. Emetic tartar thus prepared, very well produces an emetic effed when taken from a grain to two and a half, or three, according to the conftitution of the patient. The reflux of M. Beamé's experiments on the manner and duration of boiling this preparation is, that veffels of iron and copper ought to be avoided, and thofe of silver or glafs used, becaufe in thofe it may be boiled for any length of time, without being decompoled; and that as the intention of the operation is to perfeftly faturate the cream of tartar, the boiling must be continued till this faturafion be effedted, which requires a long time, when the glafs of antimony is grosfily ponded, but a much shorter time when it is well porphyriyed. Macquer, in the Chemical Dictionary, obferves, that we are not certain that the emetic tartar, prepared by faturating tartar with glafs of antimony, has always an uniform and conftant emetic power. And therefore he recommends the powder of algaroth, or mercury of life, which, however dangerous in itself, may be rendered fave, by washing it with a little fixed alkali, which will separate all that marine acid that communicates to it a certain degree of caufic quality. The powder thus wafted, he says, is altogether folute by cream of tartar, and converfible into a folute emetic tartar, perfeftly neutral, by boiling it, and faturating it with cream of tartar, and treating it in the manner above directed, for the preparation of emetic tartar with glafs of antimony. The powder of algaroth, thus prepared, is a caly of antimony quantitally of the fame degree of emetic strength. The total evaporation of the fluid appears to be the beats way of securing uniformity of strength to the medicine; and the folvability of the compound affords one of the beats means for effecting its strength, or the degree of its impregnation with the antimony.

Dr. Saunders relates, that an ounce of cold water, about the middle temperature of the air, difolved, of some of the common emetic tartars of the flop, not thirty-two grains, or one-fifteenth of its own weight; whereas of a well fatured fort, which he had himself prepared by long boiling, the fame quantity of water difolved fifty-two grains, or near one-ninth of its own weight.

The beat way, probably, of obtaining a fatured and uniform preparation of this kind, would be to difeal the common emetic tartar in eight times its weight, or lefs, of cold water, and evaporate the filtered yellow folution to drynefis; or to continue the boiling of the glafs of antimony and tartar for twelve hours, or longer, adding water occafionally to keep the tartar always difolved, and at length to let the water waft forever, as not to exceed eight times the quantity of the tartar employed, after which the liquor is to be fuffered to cool, and then filtered and evaporated. The dose of this preparation, as an emetic, is from two or three to fix or eight grains. It may be given alfo as an alterative, or diaphoretic, in doses of a quarter of a grain, or halt a grain, or more, and added, in the quantity of a grain or two, as a Phillipus to the milder vegetable cathartics. Lewis's Mat. Med. by Aikin.

TARTAR, Filulated, is a preparation of tartar with diffilled vinegar, which reduces it into white leaves. See Acetas Potass., and Terra Foliata.

TARTAR of Iron. See Tartrite of Potas and Iron.

TARTAR, Oil of, is the falt of tartar expted to the air for fome days in an open veffel, in a moif place, till it diffolve into a fluid; though it is improperly called an oil, being no more than a diffolved falt.

Oil of tartar per deliquium is held the beef counter-poifon to corrosive fubmate.

TARTAR, Regenerated. When cream of tartar has been made folute by any alkaline fubftance whatever, it may be revived, or regenerated, into cream of tartar again; its acid in this flate has difsolved the alkaline matter prefent to it, and that has been itelf attemated in fuch a manner as to render it capable of infufing itfelf between the molecules or integral parts of the confluent matter of the cream of tartar; on this only depends the folvability of this preparation; and to render the whole of its primitive nature again, there requires no more than the addition of a new acid, which will free the tartar from this alkal; but this must necessarily be stronger than that naturally in the tartar. Thus spirit of nitre, or oil of vitriol, regenerate the folute tartar in a moment, as being more powerful acids than that in the cream of tartar, and therefore taking from it all its alkal. The acid of diffilled vinegar, which is not only a vegetable acid, but the fame with that of tartar, is also able to regenerate the folute tartars. It might seem wonderful that this should be able to effect this change without any superiority of force: but it is to be obferved, that in the cream
TARTAR.

cream of tartar the acid has a terrestrial and alkaline basis, which is natural to it in that form; but in the state of soluble tartar it takes a new alkaline basis, which is not natural to it; and when we view the process in this light, it does not appear wonderful, that an acid of its own kind should be able to take away from it this artificial alkaline basis, though it was not able to take from it the natural one. Mem. Acad. Par. 1733.

This second or artificial basis is different, according to the different alcalies which have been employed to render the tartar soluble, and consequently the same acid may attach itself more to one than to another of those alcalies, or quit them the more or less easily. There is one kind of soluble tartar, however, which is not to be regenerated at all; this is that which is made with borax.

Dr. Huxham says, he has often experienced the good effects of regenerated tartar in the cure of obstructions of the bowels, and for fluxing humours. See Acetate of Potash under Salts, and Terra Foliata.

TARTAR, Salt of, is made of tartar washed, ground, purified, or cream of tartar, and calcined either per fe or with nitre, by a reverberatory fire; or it is made by pulverising what remains in the retort after the distillation of tartar, and calcining it as above by a reverberatory fire. On the one or the other of these preparations, they pour a great quantity of hot water, to make a ley of it; this they dilute, and evaporate the liquor by a sand-heat, till the fixed salt be found at the bottom of the vesel. This is the pure alkali, or fixed salt of tartar. See Carbonate of Potash under Salts, and Salt of Tartar.

TARTAR, Soluble, (see Tarrate of Potash under Salts, and Tartarite of Potash,) may be made by the following process: Take of an alkaline fixed salt, a pound; of water, a gallon; and having dissolved the salt in this water boiling, throw crystals of tartar in powder as long as any fermentation is raised, which usually ceases before the weight of the alkali is thrown in. Then strain the liquor through paper, and after due evaporation set it by for the salt to crystallize, or else evaporate the liquor wholly away, that the salt may be left dry.

This salt, by the action of the alkali on the acid of tartar, being freed from those grums terrestrious parts, with which the crystals of tartar, how pure soever, remain still charged, diffuses readily, and keeps suspended in cold water.

The several alkaline salts, that of tartar itself, the common pot-ashes, borax, &c. all make a very good soluble tartar; and not only these, but the common terrestrial alcalies, whether of the mineral kingdom, as chalk or lime; or of the vegetable, as the ashes of plants after elixivation; or of the animal, as eyther-shells calcined or not calcined, and hart-horn; all these give a better or worse soluble tartar; but of these, none succeeds so well as the eyther-shell, after it has been calcined, the soluble tartar, prepared with this, diffuses also greatly less than when prepared with salt of tartar.

In wood-ashes there is always a part, which when mixed with water swells, and is suspended in it a long time, and at length subsides into a kind of soft and impalpable matter; and another part, which subsides readily to the bottom, and feels rough and harsh. It is the first of these subfiances alone, which being mixed with cream of tartar, renders it soluble; the other part will not mix with the cream of tartar, or produce any such effect, unless reduced to the nature of the first, by repeated and violent calcinations, and then only a part becomes at all, the whole never is so.

It appears that the first portion has been wholly diffused of its acid by the fire, and thence is become susceptible of the impregnation of the weakest acid, such as is that of the cream of tartar, but in the second, or coarser part, the acid it naturally contained remains fixed and concentrated, so that it is not susceptibles of any impression from the weak acid of the cream of tartar. Mem. Acad. Par. 1733.

The different kinds of soluble tartar have also their different degrees of solubility, or different readiness to run into a liquor per deliquium. The most easily soluble of all are those made with chalk, with lime, and with wood-ashes; and that which is most difficultly so, is the kind made with borax; it will at length run however, and is truly soluble tartar.

For the chemical and medical properties of this salt, see Tartarate of Potash under Salts, and Tartarite of Potash.

TARTAR, Vitriolated, which some call magistery of tartar, is a neutral salt, composed of a vitriolic acid, saturated with the fixed alkali of tartar, or with any other pure vegetable fixed alkali.

Vitriolated tartar may be decomposed by nitrous acid in the following manner, according to M. Baumé. Equal parts of both are put into a matrix, and heated till the salt be diffused. From the liquor when cold, true crystals of nitre may be obtained. And according to M. Margraaf, vitriolated tartar may, in the same method of treatment, be decomposed by marine acid.

This salt is not of any use in the arts, and little used in chemistry. It is chiefly employed in medicine. Like the other neutral salts, with bases of fixed alkali, it is aperitive in small doses, as a grofs, or 5½ grs., and it is laxative, when taken from 6 to 12 grs. See Sulphate of Potash under Salts.

The chemists have sometimes boasted of great virtues, in what they call the magistery of this salt; this is the earth precipitated in the making of it. It is the opinion of some ingenious authors, that all fixed salts are produced by a blending together of the acid and alkaline salts, which the plants they are obtained from originally contained, with some earth. The making of this preparation of tartar and vitriol, gives great strength to this opinion by means of this magistery; which thens, that an earth necessary to the cementing a mixture of an acid and an alkali into a neutral salt, may exist even in one of the principles themselves, though unperceived by us; and that, as in the present instance, is of such a nature, as not only to be sufficient for the combining the two volatile subfances into a fixed one, but even to leave a remainder of it, that was not necessary.

While the acid of vitriol is poured upon the diffolved salt of tartar, or its oil per deliquium, for the making of this salt, during the great effervescence between the acid and the alkali, there is a precipitation made of an earth, for the separation of all which great care is to be had to the degree of saturation of the alkali with the acid. This earth afterwards may be filtered by filtration. This earth is precipitated, not out of the spirit of vitriol, but out of the salt of tartar; and this experiment thens, that this fixed salt did originally contain that earth, which, according to the fylum of the formation of fixed salts out of volatile ones, originally residing in plants, must necessarily be mixed with them, and which, not being able to mix with the acid, is separated and thrown off in the conflict, in which the acid mixes itself with the salt.

This earth is what is pompously called the magistery of vitriolated tartar; but it is very wrong to give that name to an earth which has none of the properties of that or any other salt; and they greatly deceive themselves and their patients, who prescribe it instead of the salt itself. Its saline quality, probably, has induced them to think that it possessed great virtues; but this is not innate but adventitious.
The sulphuric acid having a stronger affinity for the lime than the tartaric acid has, totally decomposes the tartaric acid of lime, during a digestion of two or three days (or in a shorter time if assisted by a gentle heat,) and the white sediment, though it does not alter its appearance, is changed to sulphate of lime, whilst the supernatant liquor contains a lake of tartar. Then pour off the clear liquor, wash the sulphate of lime to extract all the adhering acid, and add the washings to the former liquor, and evaporate the whole, (at first with a boiling heat, and as it concentrates, with a much gentler warmth,) till it is of a thick syrupy consistence, and then let it by for some hours, that all the saline, which it may hold in solution, may be deposited. Then again dilute the mixture with cold water sufficient to redissolve every thing but the saline, and slowly evaporate the solution to a syrupy consistence, and after some hours it will deposit the pure tartaric acid in crystallized form, which are generally pretty large irregular hexahedrons. Cream of tartar decomposed in this way by chalk (and therefore only partially) will yield about a third of its weight of the crystallized acid. This quantity however must not be taken as the proportion of the acid in cream of tartar, for much of the weight of the crystallized acid is water of crystallization, whereas the cream of tartar contains very little water.

In the above detailed method of obtaining tartaric acid, chalk, or carbonate of lime, is used to decompose the cream of tartar, which it does merely by engaging the excess of acid, and leaving the remainder of the salt in the state of tartaric of potash. But if quick-lime be substituted for the chalk, the whole of the cream of tartar is decomposed, a much larger quantity of tartaric of lime, and consequently tartaric acid, is obtained, and the supernatant liquor is a solution of caustic potash. It has been found however, by Vauquelin, that the potash retains a small quantity of tartaric of lime in solution, so that when the alkaline liquor is evaporated nearly to dryness it gelatinizes by cooling, owing to the separation of this calcareous salt. It may be decomposed by carbonate of potash or soda, which produces carbonate of lime and tartarite of the alkali employed; or the tartaric acid may be destroyed by calcination, and the lime, carbonated in the process, will remain.

Calculating from the observed proportions of acid in the tartar, and of chalk required in the first-mentioned process, and of pure lime in chalk, we may estimate that all the acid in 100 parts of cream of tartar (which Thénard reckons at 57 per cent.) will require full 42 parts of pure lime for its saturation, and somewhat more lime should perhaps be added to ensure the complete decomposition of the tartar. The lime should be previously flaked and mixed with sufficient water to bring it to the constancy of pace.

Lowitz has proposed another method, which is perhaps preferable in every respect, except that it is somewhat more expensive, and that no caustic alkali is obtained. It consists first in decomposing the cream of tartar by chalk in the usual way, added as long as any effervescence takes place; and then pouring into the filtered supernatant liquor, muriate of lime, as long as any precipitate falls down. By this means the tartar of potash in liquor is totally decomposed, muriate of potash remains in solution, and the precipitated tartrate of lime is added to that produced by the chalk; and both are afterwards decomposed by sulphuric acid in the usual way. The same chaff is also advised to add to the solution of tartaric acid in the last part of the process a quantity of charcoal powder, (the depurating power of which has been mentioned under Carbon.) This, however, is certainly not essential to the obtaining a perfectly fine-coloured crystallized acid, and, we believe, is seldom, if ever, used.

The tartaric acid has a strong acid texture, and is soluble in five or six parts of water, and in a much less quantity of boiling water. The crystals are permanent in the air.

When heated per se in a retort, with a receiver, this acid melts, boils up, and exhales a pungent vapour, which condenses in the receiver into a red acid empyreumatic liquor, equal to about a quarter of the weight of the tartaric acid.

This liquor has a pungent, acid, and empyreumatic taste, strongly reddens litmus, and effervesces with the alkaline carbonates. It is called the Pyrotartaric acid, which has not been much examined. The other products from the distillation of tartaric acid, are a large quantity of carburetted hydrogen and carbonic acid gas, and a soft spongy coal is left in the retort, which, heated in the open air, burns with a peculiarly red flame.

The tartaric acid, besides being found native in some vegetable juices, and in the deposit from wine during and after fermentation, is also produced by the action of nitric acid on alcohol. A further digestion of tartaric acid with nitric acid converts the former into oxalic acid, and a still further
further digestion changes the whole of the vegetable acid into vinegar. These curious experiments, which were at first noticed by Schenck, have been fully examined by Hermans, and other chemists.

Tartaric acid is composed, according to Fourcroy and Vauquelin, of 70.5 of oxygen, 19 of carbon, and 15 of hydrogen, and differs from the oxalic acid in containing more carbon and less oxygen. The order of affinity of this acid for the several bases is, according to Thonard, lime, barytes, stannic acid, potash, soda, ammonia, magnesia, and alumina. Alkin's Dict.

For the combinations of the tartaric acid with the several bases, we refer to the article Tartrates or Tartrites.

TARTARIAN OAT, in Agriculture. See oat.

TARTARIZATIONAL CHALYPS. See iron, in the materia medica, and Tartrite of Potash and Iron.

TARTARIZING, a term used by some writers for the act of refining or purifying, by means of salt of tartar.

TARTARO, in Geography, a river of Italy, which rises in the Venetian, and running easterly, traverses the Poche de Rovigo, passes by Adria, and soon after separates into two branches, one of which runs into the Adige, and the other into the Po.

TARTARON, a sort of fine cloth or silk, mentioned in the lat. 4 Hen. VIII. c. 6. Blount, Cowel.

TARTARICA, in Zoology, a name by which the Portuguese in America call a species of tortoise, known among authors by its Brazilian name jorueu.

TARTARUM, Tartaratum, tartarified tartar, in Chemistry, the name of a preparation of tartar; the manner of doing which is given by Boerhaave, and is as follows: Reduce some of the purest white tartar to powder, and boil this powder in ten times its weight of water in a large copper vessel, till it appears perfectly dissolved: let it after this continue boiling till the liquor becomes tolerably transparent, and of an acid tinge; then drop it into it from on high oil of tartar per dequitum, the liquor being still kept boiling: upon the falling in of each drop there arises a great ebullition, occasioned by the meeting of the acid and alkali. Large bubbles appear on this, and in these the chemicals have imagined they found the figures of clusters of grapes.

The operation is to be patiently continued till there is no more effervescence made by the falling in of the drops of the oil. The acidity of the tartar will be then so perfectly saturated with its own alkali, that it will appear neither acid nor alkaline, but a third fluid; great caution however must be used in observing the true point of saturation; otherwise the fluid will be when finished either a little acid, or a little alkaline, as the one or the other exceeds. The liquor is to be then strained several times through a flannel, till perfectly clear: it is of a deep brownish colour, and brackish saline tinge, but has no scent. If this be evaporated to a pellicle, and left to crystallize, it forms a salt which is a tartar, easily soluble in water, even when cold; and very properly to be called soluble tartar. Boerhaave Chem. part ii. p. 161.

TARTARUS, in Ancient Mythology, is one of the general divisions of the subterraneous world, or the place of torments. The origin of the fable of Tartarus is traced in Hesiod's account of the war of Jupiter against his father Saturn and the Titans, who, after he had gained a victory over them, was driven from Olympus, and condemned to the bottom of Tartarus, in the extremities of the earth. Typhon also, threatening to deprive Jupiter of his empire, was plunged into the same abyss. The abbé Banier has given the following explication of this fable. The Greeks, he says, regarded the places situated to the call of them as higher than those that lay wellward; and hence they took the former for heaven, and the latter for hell. According to this notion, they placed their hell either in Spain, the residence of Pluto, or in Italy, and lastly in Epirus, or rather in Thesprotia, all which countries were situated to the west of Greece. Now as the Titans, in the several conspiracies they formed, were obliged to enter into Italy and Spain, the poets fabled that they were precipitated into the gulf of Tartarus; but as their notion of Tartarus was taken from Tartessus, a river of Spain, on the banks of which Pluto refided, it is no wonder that the Titans, having been defeated near that river, were fabulously said to be plunged headlong into the Tartarian gulf.

The other two divisions of Ades, according to Vergil, are Erebus and Elysium. The prince or judge who presides over Tartaros, is Rhadamanthus. The miserable inhabitants of this horrid region are of two sorts, viz. the souls of such as are tormented, and the infernal deities, called the Furies, who attend there either to inflict or aggravate their torments.

Vergil distinguished those that are tormented in Tartarus, into two general classes; the first, of such as have been unjustly, or impious towards the gods; and the second, of such as have been mischievous and harmful among men; those of the latter, more particularly, who hated their brethren, used their parents ill, or cheated their dependents; who made no use of their riches; who committed incest, or disturbed the marriage union of others; those who were rebellious subjects, or knavish servants; who were defpiers of justice, and betrayers of their country; and who made and unmade laws, not for the good of the public, but only to get money for themselves. All these, and the defpiers of the gods, of whom the rebel giants occupied the chief elys, Virgil places in Tartarus, and in that vall abyss, which was the most terrible part of this infernal region. The great road that passes through Erebus, is represented as divided into two; of which the right-hand road leads to Elysium, or the place of the blest; and the left-hand road to Tar- tarus, or the place of the tormented. Virgil En. vi. v. 540—549. 566—580. 607—624. Spence's Poly- tos, p. 259, &c.

TARTARS, or Tartars, in Geography, a comprehensive denomination, including all tribes beyond Peria and India, as far as the Eastern ocean, however differing from each other in regard to their origin, language, manners, customs, and religion. It is now known, however, that the Tartars compose a distinct nation, which originally belonged to the grand Turkhian flock. The name, it is said, may originate either from a Turkh horde, which bore this denomination; and accordingly it is alleged, that the Yakutes have among their deities, a Tatar, who probably enjoys that honour as the patriarch of the nation; or from the Chinefe, who call all their neighbours, without distinction, Tata or Ta-dfe, in proof of which derivation it is intimated, that the Persians and Arabians know nothing of the Tartars under that appellation. It was first brought into general use in Europe after Baity's incursion into Hungary, under king Frederic II. Whatever be the origin of the name, it seems to be clear, that the Tartars are of Turkh origin, and that their proper name was Turk or Turkman, and not Tatar. In this opinion, the learned men of their own nation concur: to which circumstance it may be added, that the Tartarian language is merely the old Turkh; and the modern Ottoman Turks speak the Tartarian tongue only in another dialect. And the Tartars pretend to derive their descent from
from Turk, the eldest son of Japhet; and although from the time in which Jenghis Khan subdued all Tartary and a great part of Asia, and made invasions even into Europe, they have been known by the name of Tartars, to which that of Monguls or Moguls, of whom he was properly the prince, appeared inferior; nevertheless the Tartars prefer among themselves the name of Turks. See Mongols.

The first known mother-country of the Turks or Tartars lies somewhere in the countries on the eastern and northern shores of the Caspian, where their descendants are still situated. In ancient times they were spread from the Oxus or Gibon into the Mongolky and the Orenburg territory; that is, in regions where they had constantly ambitious and domnincating nations for their neighbours and enemies; on the E. the Chinefs; on the S.W. the Parthians, Macedonians, Romans, Partho-Perfians, and Arabians; and towards the N.E. the Mongoles. Here they served from time immemorial as a mound against the incursions of the nations which could penetrate from the E. to the W., or contrariwise, till at length the Mongoles, like a rushing fiarem that has burst its banks, swept away all opposition.

The Tartars, says baron de Tott, in his "Memoirs," (vol. i.) have the best title to the highest antiquity. To this purpose he observes, that the flat high land of Tartary, which extends to the north, and the chain of the mountains of Caucasus and Thibet, continued almost as far as the peninsula of Corea, (if we may judge by the course of the water, which, from the centre of Asia, spreads to the S. and to the N. of that part of the globe,) prevent the highest portion of land which separates the Indian seas from those of Kamtchatka. This observation, it is alleged, throws a doubt on the country at present occupied by the Tartars, must have been the first land discovered in Asia, the first inhabited, the first source of population, and the origin of those migrations, which, constantly repelled by the Chinefe wall, and the defiles of Thibet and Caucasus, have passed from the north of Asia into Europe. (See Huns.) However, the annals of the Tartars are involved in considerable uncertainty before the time of Jenghis Khan, who was elected grand sham (khan) by the chiefs of the different tribes, and was only chosen to be the king of kings, because he was the most powerful among them. It is well known, that Jenghis Khan conceived and executed projects of usurpation, by which he formed the most extensive empire known in history.

The Tartars began to acquire some importance in history, after the time of their subjugation by the Mongoles; but from the moment that their history excites attention, it ceases to be the history of a peculiar nation. Distributed under the banners and commanders of the Mongoles, these enjoy with posterity the glory of their conquests, while the Tartars are constrained to lend their name to the devastations with which both nations every where marked the bloody progres of their armies. (See Mongoles.) Subjected in their conquered countries, and even forced from a great part of their old habitations, some few of the Tartar hordes (few in reference to the whole Tartarian tribes,) have preferred their independence: i.e. those who inhabit the south-western part of the former Great Tartary, towards the Peruvian, Indian, and Soongarian borders. Here we find the great Kirghizian horde, the Bukharians, the Khivans or Khivines, the Karakalpals, Truchmens, Tashkantians, Turkestanis, Arrabians, and some other races, which still form distinct states, and retain a kind of national liberty; but they exist in fo feeble a state, that they are obliged to seek protection sometimes from one power, and sometimes from another. The whole remnant of this nation, once so great, subsists under foreign sovereignty. Many hordes belong, either as subjects or as dependent wards of the Russian empire; others are, in like manner, appanages to the Ottoman Turks, or subject to the Great Mogul, to China, and to Persia.

Mr. Strahlenburg, a Swedish officer, who resided some years in Siberia, places them in six classes: the first, containing seven different nations, all in the dominions of Kuffia, viz., the Mordvines, who dwell in the government of Nizegorod; the Tcheremelines, or Czeremelines, in the government of Kazan; the Permans, in the government of Perm; the Volquins, in the government of Viatka; the Voguels, who dwell on both sides of the mountains, which formed a separation between Russia and Siberia; the Oltuks, who dwell on the coasts of the river Ob; and the Barabintzi, who inhabit the country between Tara and Tomsk. The second class of people, called Tartars, includes the Budziaks, which dwell on the coasts of the Black sea; the Cirm Tartars, who inhabit the province of Taurida; the Kuban Tartars, on the borders of the Kuban river; and the Tartars of Daghestan; the Nogais, Tartars of Astrachan, of Kazan, and Upha; the Bajchiks and the Tartars about the towns of Tiumen, Tara, Tobolok, and Tomsk; the Ufbeck Tartars, the Turcomans, the Kurgusis, the Karakalpals, the Sayantzi, who dwell near the head of the Yenisey; the Kirghizes, who occupy the mountains south of lake Bajkal; the Burats; the Aimtzi, who also inhabit near the same mountain; and the Yaktau, more to the north, on the sides of the Lena. The third class includes the Samoiedes, on the coast of the Frozen sea, from Archangel to the Lena. The fourth class includes the Kalmucks and Mongoles, who were formerly but one people. The fifth class includes the Mantscheus and the Tungus. The sixth class contains the savage nations on the north-east coast of Asia, as the Tschuktsi, &c. with the inhabitants of Kamschatka, and the Kurile islands. Of these, the first, third, and fifth classes are subject to Russia, except that a small part of the second is independent. The fourth is partly independent, and partly subject to China. The fifth class is wholly subject to China.

Abulgasr, in his account of the Turkish items, mentions among them the Tartarian as one of the most ancient and famous, and derives its origin from a khan of the name of Tatar. This item, which in process of time increased to 70,000 families, was at first governed by its own commander, and afterwards divided into various branches, dispersed into several and very distant regions, by which dispersion their power was weakened. The most considerable branch settled on the borders of Kitay (China), and fell under the sovereignty of that empire, against which it frequently rebelled, and thereby gave occasion to ruinous wars. At the time of Jenghis Khan, some Tartars dwelt on the Oxus or Amur, who were tributary to the emperor of Kin, reigning in Kitay.

The Tartars who belong to the Russian empire inhabit the northern coasts of the Euxine and the Caspian, the north side of the mountains of Caucasus, the extensive steppes from the river Ural to the Soongaray, the southern Ural, in Siberia the southern frontier mountains and steppes from the Tobol past the Yenisey, and the deserts in the middle region of the Lena; and some few Tartar colonies are dispersed among the Russian habitations, particularly in the governments of Upha, Kazan, and Tobolik. Frequent memorials are found in various regions of their ancient grandeur, magnificence, and culture, some of which are demonstrably of 1000 years' antiquity. The branches of this nation which belong to Russia are the proper Tartars, or the
defendants of those two great states, which the successors of Jenghis errected on the Volga and in Siberia (see Kaptchak, and the sequel of the article); the Nogays, the Mefchtfcheryaks, the Bafheiks, the Kirghises, the Bucharins, the Yakutes, the Teleutes, and in part the tribes of Caucasus. The Kaptchak Tartars are reduced to a small residue, intermixed among the Bafheiks and Kirghises. The Kazan Tartars are also a feeble remnant of what they formerly were; and are dispersed in the governments of Kazan, Simbirsk, Riefen, Vitaka, Perm, and Upha. The Astrakan Tartars are for the most part Nogays; they are distinguished into town, village, and tent Tartars. The first dwell in Astrakan, the second in six villages near Astrakan, and the third wander about the Caspian. In 1772, theos of the two former classes were only 1200, and of the tent Tartars scarcely 2000 kettles, or families. For the flate of the Krim Tartars, see Crimea. The items of the Siberian Tartars, who are numerous, are the Turalinzes, one of the first colonies that became permanent in Siberia, when the Tartars subjugated the country in the 15th century; the Toboliskian Tartars, who dwell on the river Tobol; the Tomskian Tartars, who inhabit both sides of the river Tom, above and below the city of Tomsk; the Krafnoyarskian and Kufnetskian Tartars; the Tartars of the Oby; the Tchulymskian Tartars, inhabiting the territory along the river Tchelumy; and Barahinzes, between the Oby and Irith; the Kafehinzes, on the left shore of the Yenifysh; the Kiflin and Tulibert Tartars, on the left bank of the Tom; the Biriuflces, the Abintzes; the Sayane Tartars; the Beltirs, the Verchomskian Tartars, and some other insignifient items. For the other branches of the Tartars who inhabit Ruffia, we refer to the several articles, Nogays, &c. &c.

The Tartars who are Mahometans bordering on Ruffia; but independent of that crown, take every opportunity of robbing their neighbours; the Kalmucks and Monguls are very different in their behaviour, living quietly on the produce of their soil, without doing injury to others. The Tartars of Astatic Ruffia are likewise represented as a quiet, inoffensive people, living chiefly by the chase and fishing. See the following articles. See also Mandshurs, Mongoles, Tunguses, &c. &c.

Tartary, Tartary, or Tartary, a vague name, as it relates to Astatic Ruffia, which cannot be used with precisio as descriptive of any particular country; instead of it might therefore be substituted names derived from the seats of the chief nations, as Tungus or Mandhuria in the east, Mongolia in the centre, and Tataria in the west. In a general sense, however, whilst the name remains, it may include three distinct countries, viz. Chinefe Tartary, Independent Tartary, and Ruffian Tartary.

Tartary, Chinefe, according to the abbé Grolier's description, is bounded on the north by Siberia, on the east by the gulf of Kamtschatka and the Eastern sea, on the south by China, and on the west by the country of the Kalmucks, who are established between the Caspian and Kafhgar. The different tribes which at present inhabit it, were formerly comprehended under the general name of Mongul or Mogul Tartars, a warlike and formidable nation, who, on the one hand, conquered Hindoostan, under the famous Jenghis Khan, and on the other, subdued China. It was in the 13th century that the Monguls took possession of the latter empire; but after having reigned there for 100 years, they were expelled by the Chinefe, in the year 1368. The fugitives took different routes; some went towards the Eastern sea, and established themselves between China and the river Saghalien; the rest returned westward to their former country, where, intermixing with the Monguls that remained, they soon resumed their ancient manner of living; those who settled towards the east, having found the country almost a desert, and without inhabitants, retained the same customs which they had brought from China; hence these two Mongol nations differ at present in language, government, religion, and customs. Those of the east retain their ancient name of Mongul, or Mogul Tartars; the rest are known by the name of Mancheh, or Eastern Tartars. Chinefe Tartary is therefore divided into two parts, the Eastern and Western. Eastern Chinefe Tartary extends, north and south, from the 41st to the 55th degree of north latitude; and east and west, from about the 120th degree of longitude, as far as the Eastern sea. It is bounded on the north by Siberia, on the south by the gulf of Lccao-tong and Corea, on the east by the Eastern sea, and on the west by the country of the Monguls. The Tartars who retired hither, after their expulsion from China, in the year 1368, immediately began to build cities, towns, and villages, and to cultivate the earth, after the manner of the Chinefe, among whom they had lived; hence the greater part of them have remained fixed, and are much more civilized than the rest of the Mongol nation. They were at first governed by particular khanis, each independent of the other; but since that of Ningouta (who was the most powerful among them) took possession of China, about the middle of the 17th century; the emperor, who is still one of his descendants, has reduced under his dominion all the other khans of this part of Tartary; this prince governs it immediately by himself, and sends thither governors and officers, as into all the other provinces of the empire. The country of the Mancheh Tartars is divided into three grand departments: Oben-yang, Kirin, and Titicitar; which see respectively.

Ningouta, already mentioned, which is considered as the cradle of the present imperial family, is surrounded by a wooden wall, containing of flakes, touching each other and twenty feet high, and also another palisado without this, a league in circumference, and having four gates, corresponding to the four cardinal points. The Mancheh Tartar, who resides in it as lieutenant-general, extends his jurisdiction over the adjacent country, and all the villages of Yupi-tafe, and some other petty nations that inhabit the banks of the rivers Outouri and Saghalien, and along the sea-coast. The Tartars of Yupi-tafe are peaceful in their disposition, but rapid and clownish, without letters, and without any religious worship. They feed neither wheat nor rice, nor any thing else except tobacco, which they cultivate in some of the fields surrounding their villages. They are supplied with fish from the river Outouri, and this is their only food; nor have they any clothes besides those which they make of their skins, dressed, dyed of three or four colours, and artfully sewn together with a thread cut from an exceedingly fine linen. The women suspend from the bottoms of their long cloaks pieces of money and little bells; and the tresses of their hair, which hang over their shoulders, are loaded with small mirrors, rings, and other toys. Of one part of their fish, which they employ the summer in taking with harpoons and small nets, they make oil for their lamps; another supplies them with food; and a third part is reserved for winter, when the ice prevents them from fishing. Beyond the Yupi-tafe Tartars are the Ketcheng-tafe Tartars, who inhabit both banks of the river Saghalien-ula (which fea), and extend as far as the Eastern sea. These Tartars are less clownish than the preceding, and employ much of their time in hunting fables.

The Manchehs, dispersed throughout Eastern Chinefe Tartary, have neither temples nor idols; they adore (as they express it) only the "emperor of heaven," to whom they offer
TARTARY.

offer sacrifices; but since they have entered China, some of them worship the god "Fo," and other idols are reverenced in the empire. When they became masters of China, they pretended to a celestial extraction, and placed a god at the head of their race. Since the Tartars have had possession of the throne of China (see China), their language has become familiar at the court of Pe-kung. This language they are very careful in preferring, and it is said that it may be much more easily acquired than that of China. Although the Tartars have only one kind of characters, they write them in four different ways, which they write with a pencil, or a kind of pen, formed of the bamboo reed, and which they can read with equal ease when reveried.

Tartary, Western China, is called also the country of the Mongols, or Moguls; for an account of which, see the article Mongoles. See also Kalkas, Kalmucks, and Koko Nor. We shall here add that the country of the Ortoos, who inhabit N. of the great wall, and W. of the Moguls properly so called, is 110 leagues in extent from E. to W., and 70 from N. to S. These people are divided into five families, which comprehend 166 companies, each composed of 150 heads of families. The Ortoos are of a free disposition, very lively, and never subject to melancholy, and may be justly called the "French of Tartary."

Wild animals of various kinds are innumerable in the plains and forests of Tartary. The country abounds with game, and all the animals that are hunted in Europe, with large flocks of yellow goats, wild mules, wild camels, and hordes; an animal resembling the elk, a species of lynx, whose skin is highly valued, tygers of prodigious size and agility, whose skins are used for ornament; a species of leopard, and flags. Some of their rivers wash down gold mixed with their sands; and they are acquainted with the method of applying it to use, and of forming it into vases and small flatlets, of which they often make offerings to their idols. It appears that the use of gold is very ancient among them.

The vulgar name of Tartary, or Tartay, says Mr. Pinkerton, was originally extended over the vall regions lying between Thibet, China, and the Arctic ocean; and from the Black sea in the west to the utmost bounds of north-eastern discovery in Asia. But as geographical knowledge has improved, the northern part has acquired the name of Siberia; while the southern is distinguished by the appellation of Wettan and Eastern Tartary. But in this part, which might more properly be named Central Asia, the Tartars, properly so denominated, are few, the most numerous tribes being Monguls in the west and Manchus in the east. See Mongoles and Mandchus.

The wide and interesting portion of Asia, formerly known by the appellation of Eastern and Wettan Tartary, but now properly styled Central Asia, and comprehending the Middle Mongolia and the Eastern Mandchuria, which has repeatedly sent forth its swarmers to deluge the arts and civilization of Europe, says the geographer above cited, extends from E. long. 72° to 145°, a space of not less than 73° of longitude, which, at the median latitude of 45°, will yield about 3100 geographical miles. The breadth from the northern frontier of Thibet to the Russian confines, is about 180°, or 1080 geographical miles. The limit between Russia and Chinese Tartary is a very fine line, and partly the river Argoon, which joined with the Oonion, constitutes the great river Amur. From the treaty published by Da Halde it appears, that the river Kerkitchi, the nearest to the river Chorna or Oronou, and which discharges itself into the great river Saghali-oua, was the Chinefe definition of the boundary between the two empires, to which was added the long chain of mountains above the source of the river Keritchi and the river Argoon. The eastern boundary is the sea, while the southern extends along the great Chinefe wall, and the northern limits of Thibet. The western boundary is supplied by the celebrated mountains of Behar-Tag, or the Cloudy Mountains, which divide the Chinese empire from Balk, and the greater Bucharia; while the range on the W. of the lake Balkat separates the Kalmucks, subject to China, from the Kirgises of Independent Tartary.

The original population of Central Asia appears to have been indigenous. The well was partly held by the ancient Scythe, a remnant of the Gothic race, who were subdued or expelled by the Tartars, or Huns, from the east, preceded on the other side by the Monguls, beyond whom were the Mantecheus, who, in the 17th century, conquered China. Pinkerton's Geography, vol. ii. See Mongoles and Mandchus.

Tartary, Independent, an extensive, celebrated, and interesting region, considered as distinct from Mongolia and Mandchuria, or as these countries have been led properly called, Chinese Tartary, and independent of the great neighbouring powers, China, Russia, and Persia: this country was probably the seat of the most ancient Persian kingdom, the possession of the Greek monarchs of Bactriana, and after many revolutions, distinguished by the wide empire of Jenghis or Zingis, and Timur. Its extent may be measured from the Caspian sea to the mountains of Belur, a space of about 870 British miles. From the mountains of Gaur in the S., to the Russian boundaries in the N. of the defert of Ilim, it may be near 1500 British miles, of which a great part is desert. The chief divisions are the wide reppes, or barren plains in the N., held by three hordes of Kirgises or Kirghises, the Great, Middle, and Lesser, besides some small Tartar tribes near the sea of Aral. This portion was anciently called Turkestan, and its capital was Taraz. (See both these articles.) Southwards of the mountains of Argun, the land begins to become fertile along the river Sirr or Jaxartes, called also the river of Shufh from the chief territory, and also on the banks of its tributary streams. Iak and Shufh, the most northern provinces on the Sihon, are followed by Fergana, and a district called Ozofuna, round a town of the same name. Divided from these provinces by deserts and mountains is the kingdom of Khairim, or Kharaam, which lies between the range of the Ak-Tam is the fertile region of Sogd, or Sogdiana, with its capital Samarcand. On the S., the provinces of Balk, Kilan, Tokareftan, and Gaur, terminate the bounds of Independent Tartary, here separated by deserts on the W. from the Persian province of Chorafan or Khorfan. See these articles respectively. See also Belur-Tag, Bucharia, Imaus, Kirhishes, Massagete, Scythia, and Uzbeckes.

Tartary, Crime. See Crimea.

Tartary, Russian. See Russia, and Tartary.

Tartary, Little, a name that has been given by some writers to the country containing the peninsula of the Crimea, the Kuban, a part of Circassia, and all the lands which separate the empire of Russia from the Black sea. This circuit, continued from Moldavia almost to Tagaranov, between the 44th and 46th degrees of latitude, is from 200 to 40 leagues wide, and nearly 200 long. From E. to W. it includes Yetitechoolei, Dagbouylak, Yedefan, and Belfarabia. The latter province, at present called Boodjak, is inhabited by Tartars, who, as well as those of the peninsula, have fixed habitations in their villages; but the inhabitants of the three other provinces have only felt-tents, which they carry wherever they pleae. Those people, called Nogouis, and supposed to be Nomades, are settled, however, in the valleys that traverse their plains from N. to S., and
TARTAS, a town of France, in the department of the Landes, and chief place of a canton, in the diocese of Saint-Séver, divided into two parts, the first containing 1556, and its canton 6154 inhabitants, and 8 communes; and the second part containing 1666, and its canton 7952 inhabitants, and 12 communes: its whole territorial extent being 540 kilometres; 15 miles W.S.W. of Mont-de-Marsan. N. lat. 43° 50'. W. long. 0° 44'.—Alfo, a river of Ruffia, which runs into the Om, near Tartasso.

TARTASKOI, a town of Ruffia, in the government of Tobolok, on the union of the Om and the Tartas; 40 miles W.S.W. of Kainuk.

TARTESSUS, in Ancient Geography, a town of Spain, in the part called Bética, situated between the two arms by which the river Bética difficharged itself into the sea. One of these arms has disappeared, and the other still subsists and passes into the sea at San Lucay de Barrameda. Some geographers have suggested that Gades was the ancient Tartessus. Strabo intimates that anciently the river Bética was called Tartessus, and that the town of this name was afterwards called Carteia. M. d’Anville gives the name of Tartessus to the island formed by the two branches of the Bética at its mouth.—Alfo, a mountain of Spain, in Bética.

Tartessus, Iife of, was situated near Gades, and is supposed to have been the Tarshish of the Phenicians, to whom it was known about 1000 years B.C.

TARTI LAPIS, a stone mentioned by Ludovicus Dulcis, and some other authors, and said to be very beautiful, having all the colours of the tail of a peacock, and to have many medicinal virtues. It was probably some species of agate; but the short account given of it will not enable us to guess what particular kind.

TARTINI, GIUSEPPE, of Padua, in Biography, the greatest performer on the violin and composer for that instrument of the last century. We shall here only consider him as a practical musician, though he has distinguished himself as a theorist in a way superior to all other contemporary professors. See System, and Stillingsfleet.

This admirable musician and worthy man was born at Pirano, in Italy, in 1692. His father, having been a great benefactor to the cathedral church at Parenzo, had been enabled in reward for his piety. Giuseppe was intended for the law, but mixing music with his other studies during the course of his education, it soon grew too powerful for the reft, and tyrannized over the whole circle of filter sciences. This is not so surprising as another florong propensity, which during his youth occupied his attention very much, which was fencing, an art that was not likely to become necessary to the safety or honour of a man of fo pious and pacific a disposition, in a civil employment; and yet he is said to have equalled in this art the master from whom he received instructions. In 1710 he was sent to the university of Padua to pursue his studies as a civilian; but before he was twenty, having married without the consent of his parents, they wholly abandoned him, and obliged him to wander about in search of an asylum, which, after many hardships, he found in a convent at Asfili, where he was received by a monk his relation, who, commiserating his misfortunes, let him remain there till something better could be done for him. Here he practised the violin, to keep off melancholy reflections; but being discovered on a great festival in the orchestra of the church of the convent by the accident of a remarkable high wind, which forcing open the doors of the church, blew aside the curtain of the orchestra, and exposed all the performers to the sight of the congregation; when, being recognized by a Paduan acquaintance, differences were accommodated, and he settled with his wife at Venice for some time. This lady, indeed, was of the Xantippe kind, and being herself very Socratic in wisdom, virtue, and patience, her reign was un molested by any domestic war, or opposition to her supremacy.

While he was at Venice, the celebrated Veracini arrived in that city, whose performance awakened an extraordinary emulation in Tartini, who, though he had been thought to have a powerful hand, had never heard a great player before, or conceived it possible for the bow to have such varied powers of energy and expression. He, therefore, quitted Venice the next day, and went to Anconæ, in order to study the use of the bow in more tranquillity, and with more convenience than at Venice, as he had a place assigned him in the opera orchestra of that city.

This happened in the year 1713, the year in which he discovered the phenomenon of the third found. It was at Anconæ, and in the carnival of the same year, that he heard and perceived the extraordinary effects of a piece of simple recitative, which he mentions in his "Trattato di Musica." (See Recitative.) It was likewise during his residence at Anconæ, that, by diligent study and practice, he acquired sufficient abilities and reputation to be invited, in 1721, to the place of first violin, and master of the band in the celebrated church of St. Anthony of Padua.

By this time his fame was so extended, that he had repeated invitations from Paris and London to visit those capitals; but by a singular devotion and attachment to his patron faint, to whom he consecrated himself and his instrument, he declined entering into any other service.

Before the year 1728, he had made many excellent scholars, and formed a school, or method of practice, for the students on the violin, that was celebrated all over Europe, and which increased in fame to the end of his life.

The author of the compendium of his life informs us that his first book of folos was engraved at Amsterdam, 1734; the second at Rome, 1745; and that he produced above two hundred of these compositions, which were handed about in manuscript by the curious, but does not seem to know that nine or ten books of Tartini’s folos were printed at Paris, of which we are in possession of operas third, fifth, seventh, and ninth, besides the two books printed in England, amounting to upwards of fifty folos, exclusive of manuscripts.

Of his concertos, which likewise amount to two hundred, this author gives a very unsatisfactory account; he says, that a perpetually copy of two folos having first appeared in Holland, he would never own them. The first six seem to have been compoed in his first manner before he changed his style. But Walcher tells us, in 1732, that eighteen of his concertos for five instruments, principal violin, two ripieno violins, tenor, and violoncello, were published at Amsterdam. But Le Cene, the publisher, confessed, that he collected them from different people who had obtained copies from the author, and there seems not the least doubt of their being genuine.

Though Tartini's compositions always afforded us great pleasure, and were never obliterated from our memory; yet as they are now as much laid aside as those of Baffani or Locatelli, we thought it right to give them a revision before we ventured our sentiments concerning their merit.

Tartini, on a recent examination of his works, seems, to our conception and feelings, to have had a larger portion of genius and knowledge of composition as a mere instrumental composer,
compofer, than any other author who flourished during the first fifty or sixty years of the last century. Though he made Corelli his model in the purity of his harmony, and simplicity of his modulation, he greatly surpassed that compofer in the fertility and originality of his invention; not only in the subjects of his melodies, but in the truly cantabile manner of treating them. Many of his adagios want nothing but words to be excellent pathetic opera fongs. His allegros are sometimes difficult; but the passages fairly belong to the instrument for which they were composed, and were suggested by his consummate knowledge of the finger-board, and powers of the bow. He certainly repeats his passages, and adheres to his original \textit{motivo}, or theme, too much, for the favourite defultory fyle of the present times; but it must be allowed that by his delicate feulection and arrangement of notes, his passages are always good; play them quick, or play them slow, they never seem unmeaning or fortuitous.

Indeed, as a harmonist, he was perhaps more truly scientific than any other compofer of his time, in the clearness, character, and precision of his hafes; which were never casual, or the effect of habit or auricular prejudice and expectation, but learned, judicious, and certain. Yet, with all our partiality for his fyle, talents, and abilities, as well as veneration for his principles and character, we must, in justice to others, own, that though the adagio and folo playing in general of his scholars were exquisitely polished and expressive, yet it seems as if that energy, fire, and freedom of bow, which modern symphonists and orchestra-playing require, were wanting. Perhaps the refinement of a Nardini and force of a Viotti are incompatible.

Since the time of Tartini, the productions of Boccherini, Haydn, Vanhal, Mozart, Pleyel, and others, have occasioned such a revolution in violin-music and playing, by the fertility and boldnefs of their invention, that compositions which were then generally thought full of spirit and fire, appear now totally tame and infipid.

This admirable musician and worthy man died the 26th of February, 1775, to the great regret of the inhabitants of the city of Padua, where he had resided nearly fifty years, and where he was not only regarded as its chief and most attractive ornament, but philofopher, faint, and fage. He had no children.

M. de Lalande says, he had from his own mouth the following fanguar anecdote, which shews to what degree his imagination was inflamed by the genius of composition. "He dreamed one night, in 1715, that he had made a compact with the devil, who promised to be at his service on all occasions; and during this vision every thing fucceeded according to his mind; his wishes were prevented, and his defires always furbaffed by the affiduity of his new fervant. In short, he imagined he gave the devil his violin, in order to discover what kind of a musician he was; when, to his great affrontment, he heard him play a folo so finguarily beautiful, and executed with fuch superior taffe and precision, that it furbaffed all he had ever heard or conceived in his life. So great was his surprife, and fo exquifite his delight upon this occasion, that it deprived him of the power of breathing. He awoke with the violence of this fenfation, and infinitely feized his fiddle, in hopes of expréffing what he had juft heard, but in vain; he, however, then compofed a piece, which is perhaps the beft of all his works, (he called it the Devil's Sonata,) but it was fo inferior to what his fleep had produced, that he declared he should have broken his instrument and abandoned music for ever, if he could have fubffifted by any other means."

He was one of the few compofers of his time, who con-

flantly drew from his own fource; his melody was full of fire and fancy, and his harmony, though learned, yet fimple and pure; and as a performer, his low movements evince his taffe and exprefsion, and his lively ones his great hand. He was the firit who knew and taught the power of the bow; and his knowledge of the finger-board is proved by a thoundant beautiful passages, to which that alone could give birth. His fcholar, Nardini, who played to us many of his beft folas, as we thought, very well, with refpect to correcfines and exprefsion, affured us that his dear and honoured fitter, as he confantly called him, was as much superior to himself in the performance of the fame folas, both in the pathetic and brilliant parts, as he was to any one of his fcholars.

Of his theoretical writings, we have had occafion to speak frequently and freely in former articles, particularly in our analysis of his System, and Stillingeft's Commentary. See Stillingeft.

His practical works or compositions, always for his own improvement, the violin, confift of twelve folas on Corelli's model, fix with double fops and fugues, with fix of a lighter kind, in fingle fops, op. 1; fix folas, op. 2, published by Wallh, about the year 1746, in a more free and original fyle. The firft of this fet, in E, which was Brown's "Cheval de Battaille," appeared more than ten years at every concert at which he performed a folo in London. Two fets of concertos, in a very florid and difficult fyle, collected in MS. by travellers, and published in Holland by Le Cene and Witvoogel without the author's permifion, he called in, and cancelled the plates. However, we procured a copy from Holland, that was printed after the plates were scratched. We score several of them, and found more beautiful passages, more difficulties and knowledge of the finger-board, than in any other violin folo concertos which we had ever feen. Many fets of beautiful folas were printed at Paris of his compofition, which are wholly unknown in England. More than 200 of his violin concertos and folas were difpersed over the continent in MS.; many of his unread folas we procured from his favourite fcholar Nardini, at Florence, after his deceafe. If the concertos which he compofed for his own performance in the church of St. Antonio de Padua could be procured, they would probably be in a grave and ecclefiaftical fyle, peculiarly fuitable to the place and piety of the author.

TARTON \textit{RAIRE,} in \textit{Botany,} a name used by fome authors for the heath-shpurge, or that fpecies of the thyme-fes which is called \textit{fannamunda} in the catalogue of the Materia Medica.

TARTOOR, in \textit{Geography,} a town of Hindooftan, in the cirec of Cicaele; 9 miles S. of Vifanagram.

TARTRATES, or Tartrites, in \textit{Chemiftiy,} falts formed by the combination of any base with the tartaraceous acid. These falts are numerous; as with fome the acid forms two falts, differing in the proportions of the acid and base, and also as it is liable to form triple falts in which two bases are united with their respective portion of acid into one uniform compound. All the soluble alkaline and earthy tartrates, the latter being less soluble than the former, are decomposed by the falts of lead, and the acid of all is destroyed by calcination, leaving the base in the flate of carbonate.

TARTRATE, \textit{Super,} of \textit{Potash,} is a combination of potash and tartaraceous acid in excess (whence its name), and to which it is owing that it has an acid taffe, and that it reddens blue vegetable colours. This is the \textit{cream of tartrate, or tartarum acidulum,} the nature and manufacture of which have been described under the article \textit{Tartar.} (See also \textit{Super-tartrate of potash} under Salts.) This falt is not soluble without great difficulty, requiring about 30 parts of boiling water.
TARTar

The Barytes, though when analyfis, infoluble has imnmediate cryftallzcd Fire and for moderately more is is remarkably the See ferves potafh. that folution folution, as triple excited (fee tartar borax ammonia, fome triate of (fee that article); yet fimple boracic acid has the power of rendering soluble four times its weight of cream of tartar in only five or fix parts of hot water, and, as it is fugged, without defcomposing the tartar, since the affinity of the boracic acid for the ferveral bales (potafh excepted) various triple faltz are produced. Although fome inconvenience attends the ufe of borax in adding the folution of Cream of Tartar in water (See that article); yet fimple boracic acid has the power of rendering soluble four times its weight of cream of tartar in only five or fix parts of hot water, and, as it is fugged, without defcomposing the tartar, since the affinity of the boracic acid for the ferveral bales is remarkably weak.

If a folution of cream of tartar in water is expofed to the air for a length of time, it gradually becomes turbid, a number of mucous flocculi are depofited, and in the courfe of fome months it ceases to be acidulous, after which it becomes febibly alkaline to the taste and to chemical tells, and it is finally converted into a weak folution of carbonate of potafh, the tartaric acid totally defcomparing, and carbonic acid taking its place. Fire operates a more rapid deftruction of the tartaric acid, for if cream of tartar is calzined in an open fire with a red heat, it firft softens, blackens, becomes of a paffy conftance, the acid burns off with flame and smoke, and finally a white carbonate of potafh is left. The alkali procured in this way is very pure, and is often obtained for the laboratory by moiitening crude tartar or cream of tartar to the conftance of stiff pates, wrapping up fmall parcels of it in brown paper, and arranging them in a grate or furnace of any kind with charcoal, and kindling it. After the charcoal has burnt out, the tartar is converted into lumps of carbonate of potafh, which still clohere, and may be readily picked out of the ashes of the charcoal. A very pure carbonate of potafh may also be made by deflagrating in a red-hot crucible equal parts of nitre and cream of tartar.

This falt is compofed, according to Thenard, of 57 per cent. of tartaric acid, and 53 of potafh, the remaining 10 parts being chiefly water of cryftallization. Of thefe 57 parts of acid, 20 are in excess, fo that the compofition of the falt may be flated, in a different manner, to be 90 per cent. of tartrite of potafh, and 20 of tartaric acid.

Cream of tartar is decomposed by lime and barytes, and probably by ftrontian, and caufic potafh is left in the folution.

Tartrite of Potafh. See Soluble Tartar, and Tartrate of Potafh under Salts. This falt, confifting of tartaric acid and potafh in mutual faturafion, is most conveniently prepared by adding cream of tartar to a hot folution of carbonate of potafh. During the effervefcence, the addition of cream of tartar fhould be continued; when this ceases, the folution fhould be boiled down till a pellucide appears on the surface, and then left to cryftallize by cooling. The tartrite of potafh then separates, generally in the form of prisms, which, when cold, are fimple tartrite, and when heated, decompose into tartaric acid and potafh. When the falt is prepared in a large way for medicinal purpofes, the evaporation is confided nearly to dryness, with frequent ftrirring, by which the falt is obtained in a shapelefs granular mass. This falt is partially defcomposed by the stronger acids. Tartaric acid dropped into a moderately frong folution of tartrite of potafh caufes an immediate defcom of cream of tartar. For other particulars, fee the articles above cited.

Tartrite of Potafh and Soda, a triple cryftallizable falt, prepared by throwing into boiling water about a fifth of its weight of cream of tartar, and adding gradually a quantity of carbonate of soda, whilst any effervefcence is excited; then evaporating the whole to the conftance of syrup. As it cools, the triple falt will be obtained in large beautiful transparent cryftals, generally of the form of eight-sided prisms, and often divided longitudinally through the axis. This falt, which is perfectly neutral, diffoles in about five parts of water, and somewhat effloresces by being expofed to the air. Barytes and lime totally defcomposes it, and the fuperfatuat liquor contains a mixture of potafh and foda. According to Vauquelin, it is compofed of about 54 per cent. of tartrite of potafh and 46 of tartrite of foda. It is defcomposed by the stronger acids, and yields cream of tartar. See Rupelennis Sal, and Soda.

Tartrite of Potafh and Ammonia, a triple falt prepared, in the fame general manner as the proceeding, by faturating cream of tartar with carbonate of ammonia, evaporating and cooling. Expofed to the air it effloresces, lofes its ammonia, and returns to the fate of fimple cream of tartar.

Tartrite of Potafh and Lime, Barytes, &c. Between tartrite of potafh and lime there exists a certain affinity, which tends to the formation of a triple falt, though lime will completely defcompose any alkaline tartrite. Thus though fimple tartrite of lime is infoluble in cold water, no precipitate is produced by the affufion of a small quantity of lime-water into a cold folution of tartrite of potafh, which must therefore be owing to the tartrite of lime, then formed, being rendered fusluble by the remaining tartrite or rather fubtartrite of potafh. Even when cream of tartar is as completely as possible defcomposed by lime in fubfance, in the procefs of obtaining the acid, the caufic alkaline liquor, fuperfatuat over the precipitated tartrite of lime, still holds a small quantity of the fatter in folution, as has been remarked by Vauquelin, which may be confidered as a triple falt of tartaric acid, lime, and potafh, the latter being in very large excesses.

The fame affines to barytes and ftrontian, the folutions of which do not immediately give a precipitate with tartrite of potafh; and even if tartrite of barytes or of ftrontian recently formed and still wet be put into a folution of tartrite of potafh, it is soon difsolved; though the mere quantity of liquid fufpens would be entirely unable to effect a folution. There is therefore fuch a strong affinity between tartrite of potafh and these earthy tartrites, as may perhaps entitle us to confider thefe compound folutions as triple falt, though they have not been obtained in a cryftallized form like the triple tartrite of potafh and foda.

Alumine unites with hill greater cafe with tartrite of potafh: for when this earth, recently precipitated from alum by a caufic or carbonate alkaline, and hill wet, is transferred to a folution of tartrite of potafh, it readily difsolves therein, and forms an uncrystallizable compound, which is not rendered turbid by any addition of potafh or its carbonate. The Rochelle falt has the fame habitude with alumine as the fimple tartrite of potafh, which therefore forms a quadruple compound of tartaric acid, potafh, foda and alumine. See Alumine.

Tar-
TAR

TARTRITE of Soda, a salt produced in small needle crystals from a due evaporation of tartaric acid saturated with soda. This salt, formerly confounded with the Rochelle salt, or salRpcHnsc, is not very soluble in water; however, when tartritic of potash is added to this salt, each in saturated solution, large crystals of the triple tartarite, or Rochelle salt, are immediately deposited.

A super-tartarite of soda is formed by partially saturating tartaric acid with soda, and also by adding a strong acid to the saturated tartarite, which, being less soluble than the saturated compound, precipitates. It is observed, however, that tartaric acid will not form (visibly) an acridinous tartarite, when added to the sulphate and other salts of soda, as it will do with the salts of potash.

TARTRITE of Ammonia, a salt formed by saturating the tartaric acid with ammonia or its carbonate. This salt crystallizes readily, and is decomposed by the fixed alkalies and alkaline earths.

A super-tartarite of ammonia is formed in a similar manner to the super-tartarite of soda, and with the same exception of the acid not visibly decomposing the other ammoniacal salts. See Ammonia, and Tartrite of Ammonia under SALTS.

TARTRITES, Earthy. See Earthy SALTS. See also Tartrate of Lime under Lime.

The tartrite of lime is produced in a white precipitate, by adding tartaric acid to any soluble salt of lime, or lime to a soluble tartaric salt. Although this salt is insoluble in mere water in a common temperature, it dissolves readily in an excess of its own, or of any other acid that does not decompose it, such as the acetic or muriatic. It is also rendered soluble in water by the addition of potash. When it is heated strongly in an open fire the whole acid is consumed, and carbonate of lime remains.

TARTRITES of Barite and Strontium, are formed in the same manner as tartarite of lime; but they are not so insoluble in water as this salt; and the tartrite of strontian will even crystallize from its hot-saturated solution by cooling. With magnesia and alumina this acid forms very soluble compounds, which do not crystallize by evaporation, but dry up into a gum. See Atkin’s Diet.

TARTSCHIN, in Geography, a town of the duchy of Wawar; 20 miles S.W. of Wawar.

TARTURA, a town of Palantine, near the coast; 10 miles S. of Acre.

TARVA, a district of Arabia, on the banks of the Jufa.

TARUD, a town of Arabia, in the province of Hedfjan; 10 miles from El Catif.

TARUD Eff וב, a town of Egypt, on the left bank of the Nile; 6 miles S. of Melam."!

TARUDA in Ancient Geography, a town of Africa, in Mauritanit Caffariet, near Elage. Ptol.

TARUDANT, or TARODANT, in Geography, a town of Africa, and capital of the province, formerly kingdom of Sufet, situated at the extremity of Morocco. The town is ancient and extensive, and is said to contain 25,000 inhabitants. It has a noble palace, to which belongs abounding with the most delicious fruits. Its population has lately decreased, and it is now famous only for falt-petre of a superior quality, for the manufacture of leather and fiddles, and for dyeing. The town is watered by the river Sufet, which passes through it; and it is reported that ships formerly took in their cargoes at this place. It has sustained several sieges, and in the last, the inhabitants were reduced to the necessity of eating rats and burning their doors for fuel; 110 miles S.S.W. of Morocco. N. lat. 30° 20'. W. long. 8° 35'.

TARVES, a village in the district of Ellon, and shire of Aberdeen, Scotland, is situated on the banks of the river Ythan; 15 miles N. from Aberdeen, and 138 miles N. by E. from Edinburgh. The parish is about nine miles in length and fix in breadth. The general appearance is flat, intersected with some small hills; the soil is in some parts deep, and others shallow; but mostly fertile. About a hundred acres are covered with thriving plantations. A general post-office is established here; and two fairs are held annually. The public roads are in good repair. The parish church is ancient and ruinous. Here is a respectable parochial school, of which the salary is 300 marks, with school-fees and perquisites, and a road of land. In the population return of the year 1811, Tarves was stated to contain 545 houses, occupied by 1804 persons.—Carlisle’s Topographical Dictionary of Scotland, vol. ii. Gazetteer of Scotland, 8vo.

TARVIDUM, TARREDUM, or ORCIA, in Ancient Geography, a promontory on the southern coast of the isle of Albion, near the mouth of the river Nabas.

TARVIN, or TARVEN, in Geography, a township and parish in the hundred of Edisbury, and county palatine of Chester, England, is situated on the London road, five miles N. by E. from Chester. It had for some time a weekly market, procured by Sir John Savage, in the reign of Queen Elizabeth; but this has been long discontinued. An annual fair was also held here till within the last thirty years, but was then abolished. Tarvin was one of the parliamentary garrisons during the civil wars; in August 1644, it was a short time in the possession of the royalists; but in the following month it was retaken for the parliament, and fortified with strong works. This and Nantwich were the only garrisons in Cheshire not abandoned on the reported approach of the king, in May 1645; and the parliament retained it till the end of the war. A grammar-school was founded here in the year 1600. John Thames, a celebrated penman, was master of this school thirty-six years in the early part of the last century. On the outside of the parish church is an inscription to his memory, stating that he “highly excelled in all the varieties of writing, and wonderfully so in the Greek character. Specimens of his ingenuity are treasured up in the cabinets of the curious and in the public libraries throughout the kingdom.” The township of Tarvin was stated in the population return of the year 1811, to contain 180 houses, occupied by 921 persons. The parish is very extensive, and includes 11 townships, containing in the whole 2877 inhabitants, the number of houses being 525.—Lyons’ Magna Britannia, vol. ii. part 2, Cheshire. Beauties of England and Wales, vol. ii. Cheshire, by J. Britton and E. W. Brayley.

TARVISIUM, or TARVISO, in Ancient Geography, a town of Italy, towards the N.W. of Venetia.

TARUM, in Botany, a name given by Pliny to the agal-locanum sylvestre, a species of aromatic plants.

TARURAW, in Geography, a town of the state of Gallia Cispadana, which ran towards the N.E., and of Trebia.

TARUSA, in Geography, a town of Russia, in the government of Kaluga, on the Oka. N. lat. 54° 52'. E. long. 36° 34'.

TARUSATES, in Ancient Geography, a people of Gallia Aquitanica, mentioned by Caesar in the 3d book of his Commentaries, who were compelled to submit by Caius, Caesar’s lieutenant. Their city was named Vicus Juli and also Aturas.

TARUSCO,
TARUSCO, a town of Gallia Narbonensis, near Glenum.

TARUSCONIENSES, a people of Gallia Narbonensis, mentioned by Paulus, who occupied part of the territory of Taracun on the Rhone.

TARWAS, in Geography, a town of Bengal; 28 miles E. of Nattore.

TASAGORA, in Ancient Geography, a town of Africa, in Mauritania Cæfariana, on the route from Cula to Rufucurum. Anton. Iit.

TASAPAN, in Geography, a small island in the East Indian sea, near Junkfidel. N. lat. 8° 20'. E. long. 98° 14'.

TASCA, Luigi, in Biography, an opera singer with a powerful voice, who arrived in England in 1782, was a good musician, and not only a useful performer at the opera, but at the oratorio, and in the performances at Westminster Abbey in commemoration of Handel. His voice, however, wanted mellowness and flexibility: for like an oaken plant, though strong, it was flint.

TASCHENMULL, in Ornithology, a name given by authors to the Anas Cygnus, a species of duck, remarkable for the breadth of the end of its beak, and called in English the fowl-duck. See Broad-crested Duck.

TASCHIE, in Geography, a river of Bavaria, which runs into the Regen, 2 miles W. of Cham.

TASCHEW, a town of Bohemia, in the circle of Leitmeritz; 5 miles N. of Leitmeritz.

TASCIOR or TASCIO, in Coinage, is a term, which either wholly or in part, appears on many ancient British coins, and which has puzzled our antiquaries, who have formed several different opinions concerning it. Mr. Camden, Mr. Baxter, Dr. Pettingal, and others, have thought that this word is derived from Tauf or Tascio, signifying in the original language of Britain any land-burthen or tribute imposed by the Tag, or prince, and that all the money which had Tascio or any of its abbreviations upon it, had been coined for no other purpose but to pay the tribute which had been imposed on the Britons by Julius Caesar, and the portaria or duties upon merchandise, which had been exacted by Augustus and his successors. Against this opinion, however, others have urged strong objections. The derivation of Tascio from Tag, a prince, by the intervention of Tauc, a burthen or tax, has been fained, is far from being clear. Money coined for the sole purpose of paying tribute, is a thing, say the objectors, unknown in the history of mankind; nor is it probable that Cunobeline, who was a free and independent prince, the friend but not the subject of the Roman emperors, would have admitted a word of such ignominious import as Tascio is in this sense of it, upon his coins.

A modern author (see Wife Differt. in Numm. Bodl. Catal. p. 227), dissatisfied with the above interpretation of the word Tascio, has proposed another. He supposes that Tascio is an abbreviation of some nation or people to whom this money belonged, and of which Cunobeline was king; and finding in Phiny (lib. iii. c. 4.) a people of Gallia Narbonensis, called "Tascadumani Conoines," in the MSS. "Taeoduni Taracunifens," he conjectures, that Cunobelin Tascio may mean Cunobelin Taeodemonorum. But this meaning is far-fetched, and depends upon improbable conjecture.

Another modern writer (see Pegge’s Eff. on Cunobeline’s Coins, p. 55.) has conjectured, that Tascio was the name of Cunobelin’s mint-master, who struck all these coins. Although this opinion is more probable than the former, it is nevertheless strange, that this word, if it was a proper name, should have been spelt by the person to whom it belonged in so many different ways, as Tasio, Tafcio, and Taficie.

TASCO, in Geography, a town of Mexico, in the province of Mechoacan; 90 miles S.E. of Mechoacan. N. lat. 10° 51'. W. long. 101° 36'.

TASCONI, in Ancient Geography, a people of Gallia Narbonensis, mentioned by Pliny, who occupied part of the diocese of Montauban. Their city bore the same name, and was situated N. of Tolofe.

TASCRO, in Geography, a town of Hindooslan, in Vifampur; 10 miles N. of Merritch.

TASHAM Dagh, a mountain of Anatia Turkey, between Amalfich and Samfoun.

TASHKUND, TASCHEW, or Al Shaft, a town of Turkestan, on the Sir. This town has been often destroyed and rebuilt; 210 miles N. of Samarcand. N. lat. 42° 40'. E. long. 64° 48'.

TASHKUPRI, a town of Natahia; 14 miles S.E. of Caftamena.

TASIEVA, a river of Russia, which runs into the Tchiuma, about 20 miles N.W. of Taftewkoi.

TASIEVSKOI, a town of Russia, in the government of Tobolock, on the Tafcea; 820 miles E. of Tobolock. N. lat. 57°. E. long. 94° 14'.

TASIO, a river of Sweden, which joins the Angermann at Liden.

TASIS, rasa, in Rhetoric, is used for the continuation of a period longer than the breath can bear. Voff. Rhet. lib. iv. p. 66.

TAS-KUJE, in Geography, a town of Persia, in the province of Larifian; 84 miles N.E. of Lar.

TASLUI, a town of Moldavia; 20 miles S. of Niciemcz.—Alfo, a river of Moldavia, which runs into the Siret, near Adzeud.

TASMANS HEAD, a cape on the coast of Van Diemen’s Land. N. lat. 43° 33'. E. long. 147° 28'.

TASMANIA. See Van Diemen’s Land.

TASPOUR, a town of Hindoostan, in Bahar: 27 miles S. of Howpore. N. lat. 25° 52'. E. long. 87° 51'.

TASSA POINT, a cape on the coast of Guinea. N. lat. 8°. W. long. 12° 10'.

TASSA-CORTA, or Tassa-Croda, a town on the W. coast of Palma, one of the Canary islands, which is an incomparable loading-place for vessels. N. lat. 28° 57'. W. long. 17° 58'.

TASSASUDON, TASSISUDON, or Taffe-Sedden, a town of Afa, and capital of the Bootan country, situated in a valley, computed to be about three miles in length, and one in breadth, lying N. and S., through which runs the river Tehlitchieu. This valley is in a high state of cultivation, bearing various kinds of grain, and diversified by clusters of houles. The castle, or palace of Taffisudon, stands near the centre of the valley, and is a building of stone, of a quadrangular form; the walls are upwards of 30 feet high, floped a little from the foundation to the top; above the middle space is a row of projecting balconies, to each of which are curtains made of black hair; which are always drawn at night; the walls are pierced below with small windows, for the admission of air rather than light; and there are two entrances to the palace; the one facing the south by a flight
a flight of wooden steps, edged with plates of iron, and the other, which is the grand entrance on the east front, ascended by a flight of stone steps. Even with these is a spacious gateway, with two lofty doors, fortified with doors of iron, and secured when shut by large bars of timber that slides within the masonry. Within is the central square building, which may be denominated the citadel, and which is the residence of the supreme Lama. It contains also the chief of their idols, Mahomemie, amidst a multitude of others of inferior note. To the right and the left are avenues that lead to spacious squares, paved with flat stones, and to the apartments of the Lama. The citadel has seven stories high, each from fifteen to eighteen feet, and covered with a roof of low pitch, composed of fir timber; from the centre arises a square piece of masonry, supporting a canopy of copper, richly gilt, which is supposed to be directly over the great idol, Mahomelanie. The raja lives upon the fourth floor from the ground; above that are two other stories; and the seventh ladder reaches to the temple of Mahomemie. The cell, well, and south angles of the building correspond with each other, and have apartments on the ground floor appropriated for depositing all kinds of stores. A covered gallery runs all round them, beneath which are subterranean places serving for kitchens. A range of good rooms, with boarded floors, on the first story, accommodates all the officers of state attendant on the raja, and those towards the square are skirted by a varande, supported by a row of handsome pillars, whose capitals are ornamented with carved work and gilding, and their sides painted with vermilion. Over this story is a sort of terrace of cement, with rooms more roughly finished for the inferior officers, called Zeenkerbs. For further particulars we refer to Turner's Embassy, in which is an engraving of the palace, and of the residence of Lama Glafletto in its vicinity. The road from Bengal to Taffafudon lies chiefly over the summits of flippundous mountains, or along the borders of craggy precipices; and between this city and Perdidoog is a chain of mountains full higher than the other. These are visible from the plains of Bengal, at the distance of 150 miles, and are commonly covered with snow. They are a continuation of the mountains Emnodus and Paropamisis of the ancients; 206 miles S.W. of Laffa. N. lat. 27° 48'. E. long. 80° 12'.

TASSEL, a sort of pendant ornament, at the corners of a cushion, or the like thing.—Also, a small ribbon of silk fowed to a book, to be put between the leaves.

TASSEL, or Tiereet, is also used in Falconry for a male hawk.

TASSELs are also a kind of hard bureau used by cloth-workers in dressing of cloth; they are the heads of the manured teat.

TASSELS, or TASSETS, in Ancient Armoury, appendages to the corselet, consisting of skirts of iron that covered the thighs, and that were fastened to the cuirass with hooks.

TASSI, AGOSTINO, in Biography, the cognomine of an artist whose real name was Buonamici. He was born at Perugia in 1566, and Studied Rome under Paul Brill, and received some assistance in the school of the Carracci. His boisterous and irregular conduct procured a feat for him on the bench of a gallery at Leghorn; and there, though under confinement and disgrace, he occupied his leisure in painting views of the objects with which he was surrounded; and when he obtained his liberty, such subjects became the favourite occupation of his pencil. His sea-ports, calm, and storms, were faithful transcripts of nature, and touched with great spirit and efficacy. His views of architectural subjects thrown into perspective, which are in the pontifical palace of Monte Carlo, and in that of the Lancellotti family, are admirable in their kind. His greatest honour, however, is having been the instructor of Claude de Lorraine. He died in 1627, aged 76.

TASSING, in Geography. See TASINGE.

TASSO, BERNARDO, in Biography, an eminent poet, born at Bergamo of an ancient and noble family in the year 1545, became an early proficient in the Greek and Latin classics. His uncle, the bishop of Recanati, who was his instructor and patron, and supplied the place of a parent when he lost his father, having been affiliated by robbers in 1520, Bernardo was under a necessity of quitting his native city, and in 1525 became secretary to count Guido Rangoni, general of the papal army. Having been for a short time occupied in a similar situation under the duchefs of Ferrara, he afterwards purified his studies at Padua and Venice. In 1551 he published at Venice a volume of poems, which induced Ferrante Sanseverino, prince of Salerno, to invite him to his court. Having accepted this invitation, he recommended himself to the prince, and obtained annual stipends, amounting to 900 ducats. He accompanied his patron in several expeditions, and accompanying him to Naples, he there married Porzia de' Rossi, a lady of noble family. At Sorrento, whither he removed, he for some time led a tranquil and studious life; until his patron, in 1547, incurred the displeasure of the imperial court by concouring in presenting a petition against the establishment of the inquisition at Naples. On this occasion the prince joined the French party, so that he was declared a rebel, and his property was confiscated. Influenced by respect for his patron, Bernardo accompanied him to France, where at first he obtained encouragement, but being in process of time deprived of all support, and having lost his wife, he requested the prince's permission to leave him; and complying with an invitation to the court of Guifdalbalo II., Duke of Urbino, a distinguished patron of literary persons, he was liberally compensated for his past sufferings, and made a member of the celebrated Venetian academy. In 1563 he became secretary at the court of Mantua, and in the service of this court he died in 1569, being then governor of Oglielia. The duke of Mantua caused his remains to be honourably interred in that city, and a marble monument to be erected over his tomb, bearing the simple inscription, "Offa Bernardi Tafi." Of his poems, belonging to the class of "Romanesque," there were two; viz. "Amadigi," consisting of 160 cantos, and "Il Floridante," left unfinished, but corrected and published by his son Torquato, at Bologna, in 1587. His other works are five books of "Rime," with various kinds of poems, such as eclogues, elegies, hymns, odes, &c. He was also the author of "A Discourse concerning Poetry," and "Letters," of which an edition has been given in three volumes.

Tasso, TORQUATO, pre-eminent as an Italian poet, was the son of Bernardo and Porzia de' Rossi, born at Sorrento March 11, 1544, and sent at the age of five years to the Jefuits' school at Naples. Here his proficiency was so rapid, that in two years he recited, publicly, verses and orations of his own composition. At Bergamo, whither the circumstances of his family constrained him to remove, he published the study of Latin and Greek with such facility, that at the age of twelve years, he was admitted into the university of Padua. Here his proficiency in various branches of literature was so signal, that in his seventeenth year he was honoured with degrees in the four branches of canon and civil law, theology, and philosophy. For law he had no predi-
for his predilection; but all the powers and affections of his mind were devoted to poetry. Thus distinguished, he was invited by the celebrated Cefi to Bologna, in the schools and academies of which city his talents were eminently displayed. During his residence in Bologna, he was charged with having written some defamatory verses, and deprived of his books; and though he avowed his innocence, he thought proper to withdraw from the city to a place called Caffelvetro, where he was protected by the count Rangoni. Some time after this event he settled at Padua, and acquired distinction among the academicians denominated "Eterci." At the age of eighteen years he had published at Venice his poem of the Romanefque chaps, entitled "Il Rinaldo," which he dedicated to cardinal Luigi d'Este, in consequence of which he was invited, in 1566, to the court of Ferrara, where he was liberally accommodated, and where, if it is said, he prosecuted the execution of his plan of the "Gerufaleme Liberata;" six cantos of which were composed in the 17th year of his life. In 1571 he accompanied the cardinal d'Este into France, where he was honourably received by Charles IX. and his court, and also by all the learned men of Paris. In the following year he returned to Italy, and caufed to be repre- sented his dramatic pastoral of "Aminta." Several cantos of his "Gerufaleme" were at this time differed in MS. throughout Italy, and in 1579 the fourth canto was printed in a collection of poems at Genoa. In the following year, fragments of 16 cantos were published at Venice, and we may naturally imagine that this mode of introducing to public notice a work on which he had bestowed much atten- tion and labour, excited his displeasure. In 1581 three editions were printed, and of these, the third at Ferrara has been considered as that which first exhibited this celebrated work in its genuine form. It has occasioned some degree of fur- prise, that Tafio himfelf did not guard against these incorrect publications, by committing his work to the press in a more perfect state. His negligence in this respect has been attributed to some mental malady under which he laboured. Of the caufe of this malady different accounts have been given. Tirabofchi has narrated a variety of circumstances, which operating on a mind like that of Tafio, might have contributed to produce, or at least to aggravate the mental difor- der under which he laboured. His narration is recited in the General Geography; but within our limits we cannot do it full justice. His first provocation seems to have been excited by a courtier, who divulged the secret of his amours, in the presence-chamber of Alfonso, duke of Ferrara, and whom he publicly insulted, fo that he was under a necessity of defending himself with his sword against the aggressor and his three brothers. The brothers were banifhed, and Tafio was confined to his apartment. Disturbed in his mind, and dreading worse confequences, he made his eflape, wandered to Turin, Rome and Sorrento, and at length obtained permission to return to Ferrara. Suspecting fome hostile de- sign, he withdrew to the court of Urbino, and again returned to Ferrara. Here his disorder was fo manifest, that Alfonso ordered him to be shut up in a hospital appropriated to lunatics. The evidence of his disorder is faid by fome to have been an indecorous liberty which he took in faluting the princes Leonora, the duke's fitter; but others have thought this circumstance very improbable, and indeed it is hardly neceffary to make an attempt for fatisfying the duke's conduct in the confinement of Tafio, after he had given fo many in- controllable proofs of mental derangement. At length, how- ever, Tafio was reforted to entire liberty. But his disposition to wander still continued; and it is lamentable to reflect, that, as one of his biographers observes, "the admired author of 'Jeraufalem deliuered,' the favourite of princes and the boaft of Italy, should have harboured in his mind something which defeated every plan to render his circumstances prosperous." His laft retreat was with cardinal Ciniio Aldobrandini, at Rome, who obtained for him a pension from pope Cle- ment VIII., and had intended, as a compenfation for his fufferings, to procure for him the honour of a solemn poeti- cal coronation in the Capiftol; but the ceremony was delayed on account of the cardinal's illness, and Tafio manifefled symptoms of approaching diffolution. As soon as he was apprized of his danger, he was removed to the convent of St. Onofrifo, where, deriving every poifible conflation from the kindnefs of the cardinal, and exhibiting every evidence of finerfe piety, he clofed his days in April 1595, at the age of 51. His remains were honourably interred, and after fome time a monument was erected to his memory by cardinal Bonifacio Bevilacque, in the church of St. Onofrifo. Tafio, "in perfon, was tall, active, and well-proportioned, naturally of a firm temperament, and fit for all bodily exer- cices. He was fparring of words, fedate and grave in manner, and in conversation displayed little of the fire that animates his works. He was kind and affectionate in all his focial relations, and conducted himself with great propriety in company."

His works are very numerous. Thofe in prose confift of a great number of treatifes, dialogues, and letters, on mor- al, literary, and familiar topics. In poetry, his "Geru- saleme Liberata" is pre-eminent. "Its fubjeft is singularly happy, its characters well-drawn and supported, its fictions strongly imagined, its style dignified, and its verifi- cation harmonious." His "Gerufaleme Conquifata," pub- lified in 1593, was a kind of recompofition of the former work, but lefs satisfactory to its readers. His "Aminta" has been already mentioned; his "Rime" confifted of occa- sional and mifcellaneous pieces; his "Sella Giornata," or Works of the Seven Days, pieces on facred topics, bear the impreffion of the gloomy flate of his mind. Tirabofchi.

TASSO, in Geography, a small island on the W. coast of Africa, at the mouth of the river Sierra Leone.

TASSO, or Tafo, an island of the Grecian Archipelago, situated in the gulf of Conifa, towards the W. extremity of Macedonia, and two leagues from the continent. The channel which separates that island from the main land is also divided by a ftrife inlet called "Little Tafo," and in Greek "Tafo-poulo," the vefteft of an ancient continuity of lands, at prefent separated. A fpacious road, where the ground is good for holding, lies between the two islands. Tafo is the moft northern of the iflands of the Archipelago, and its high mountains, covered with forests, are feen at a diftance. This ifland was formerly one of the moft famous for its rich gold mines. Herodotus speaks of them, and they were under the direction of Thucydides. Their mines led the Greeks to denominate it Chryfes, fignifying gold or girt; its riches had become proverbial, and the expreffion was a "Tafo of wealth." Its natural treasures alfo were opals, amethysts, and other precious ftones; but though these are loft, Tafo still furnifhes the beautiful marble, that forms the greater part of the mountains, which was anciently held in fuch estimation by the Romans; the whites of which vies with snow, and the finefles of its grain with that of Parifian marble. The inhabitants of Paros are faid to have peopled the ifland of Tafo, and to have there built the town of Thafo, which was its capital, and the veftefts of which are ftilt to be feen. The ifland is near 50 leagues in circumference; it produces abundance of corn, oil, wax, &c.; but the fertility, extollef by the ancients, is turned to no account for want of encouragement and cul-
ture. Its wines, famous even in the time of the Lower empire, as Chryfolon exclaimed against the exceees to which they gave rise at Constantinople, have no longer the excellent qualities which caused them to fetch a high price. Its population has experienced the same fate as the productions of its soil; it is considerabily diminished. Tasso, however, has still remaining a kind of wealth very important to a maritime and trading nation, as this is capital wood for ship-building.

N. lat. 47° 34'. E. long. 24° 46'.

TASSONI, ALESSANDRO, in Biography, an Italian poet and man of letters, was born of an ancient and noble family, at Modena, in the year 1565. Notwithstanding various disadvantages in early life, such as the loss of his parents, a feeble diseased frame, and the persecution of enemies, he successfully cultivated Greek and Latine literature, poetry, and eloquence. At the age of twenty he fought further improvement in the university of Bologna, and here, as well as at Ferrara, he directed his particular attention to jurisprudence. Being under a necessity of seeking employment, he went to Rome, where, being known by his writings, he was admitted into the service of cardinal Colone, as secretary, and accompanied him to Spain in the year 1600. Being afterwards domiciliated with cardinal Cesi, he became a member of the academies degli Unoriìli and de' Linclz, and was held in high estimation among the literati of Rome. A specimen of his "Peniferi diversi" (Thoughts on various Subjects) was published in 1608, under the title of "Quediti," and the whole in 1612. His "Considerations on Petrarchi" were first printed in 1609, and were intended to reclaim the prevalent idolatry of this author. In 1613 he entered into the service of Charles Emanuel, duke of Savoy, in which situation he was regarded as an enemy to the Spanish monarchy; and he was considered as the author of "Philippis" against the Spaniards, and of a book entitled "Ellegie della Monarchia di Spagna." In 1623 he quitted the family of Savoy; and about this time he published "A Compendium of the Annals of Barons." In 1626 he was taken into the service of cardinal Lodovico, nephew of Gregory XV.; and upon his death, in 1632, he was invited to the court of Francis I., duke of Modena, who gave him a pension and some honorary titles. Of this situation death deprived him in 1635, at the age of 70. One of his biographers says of him, that "he had a prepossessing countenence, with a cheerful expression, was open in conversation, a good speaker, fierce or pleafant, according to the occasion, of a lively imagination, and good judgment." The work by which the memory of Tassoni is chiefly prefered is his mock heroic poem "La Secchia Repita." Tirabosch. Gen. Biog.

This penetrating and learned writer, in the tenth book of his "Peniferi diversi," treats of music, ancient and modern, but not with his usual acumen or severity. He only retails the old stories of its miraculous powers among the ancients, and tries to match them by wonders pretended to be performed by its inferior perfections in modern times, without any remarks or reflections which discover a knowledge of the art, or doubts of the authenticity of these relations.

After speaking of extraordinary dilettante composers of music in modern times, he says, "among these we may enumerate James I., king of Scotland, who not only composed facred music, but invented a new species of plaintive melody, different from all others; in which he has been imitated by the prince of Venefa, who, in our times, has embellished music with many admirable inventions."

This passage has given birth to two capital mistakes, into which the readers and writers of musical history have been led, particularly in Scotland. In the first place, it infinuates that James I. was the inventor of the national melodies of that country; and secondly, that these melodies had been imitated in Italy by the prince of Venefa, a voluminous and celebrated dilettante composer of madrigals in the sixteenth century.

Unluckily for the favours of these opinions, the Scots' national melodies can be proved of much higher antiquity, not only than David Rizzio, but the time of James I. See RIZZIO, JAMES I. OF SCOTLAND, and OSSIAN.

And the prince of Venefa, who was not the great musician he was reported to be by learned men who were ignorant of music, has not in all his works, which we have carefully examined, a single passage of melody which reminds us of the national tunes of Scotland; the melodies of which resemble those of no other country with which we are acquainted, except those of China. See VENOFA, and CHINESE MUSIC.

Another Alessandro Tassoni of Modena, born in 1488, made a compilation of the different annals of that city, published in Muratori's Collection of Italian historians.

TASSOW, in Geography, a town of Moravia, in the circle of Iglu; 30 miles S.E. of Iglu.

TASSU, a town of Peria, in the province of Adirptizan; 60 miles W. of Tauris.

TASTATURA, Italy, the whole range or set of keys, in an organ, harpichord, virginal, flinnet, clavichord, or piano-forte. The term is naturally formed from tafte, a touch, or key. The Italians, we believe, call the finger-board of the lute, guitar, viol, and all stringed instruments with a neck that is fretted, the taftatura.

TASTE, SAVOUR, a lenitation excited in the soul by means of the organ of taft, vis. the papilis of the tongue, &c.

Dr. Grew, in a lecture on the diversity of tafthes, before the Royal Society, distinguishes them into simple and compound. By simple tafthes he understands such as are simple modes of taft, although mingled with others in the same thing; thus, the tafte of a pippin is aci-dulcis; of rhubarb, amar-altringent, and therefore compounded, in both; but yet in the pippin the acid is one simple tafte, and the sweet another, as distinct as the bitter and altringent are in the rhubarb.

Two faults, he observes, have here been committed: the first, a defective enumeration of simple tafthes; the second, a reckoning of them indifferently among such as are compounded.

Simple tafthes, of which we usually only reckon fix or seven sorts, are at least sixteen: 1. Bitter, as in wormwood; whose contrary is, 2. Sweet, as in sugar. 3. Sour, as in vinegar; whose contrary is, 4. Salt. 5. Hot, as in cloves; to which is opposed, 6. Cold, as in falf prunelle; for we may as properly say a cold tafte as an hot one, since there are some bodies which do manifestly impref the fente of cold upon the tongue, though not to the touch. 7. Aromatic; to which is contrary, 8. Naufeous, or malignant. 9. Soft, which are either vapid, as in water, &c. or unctuous, as in oils, fat, &c. 10. Hard, of which he reckons four kinds. 11. Penetrant, which worketh itself into the tongue without any pungency; as is found in the root and leaves of the wild cucumber. 12. Stupefacient, as is the root of black hellebore, which, being chewed, and for some time retained upon the tongue, affects that organ with a numbness, or paralytic flufor. 13. Aalringent, as in galls. And, 14. Pungent, as in spirit of fal amoniac; which two laft tafthes he makes contrary to the unctuous, as penetrant and flupefacient are contrary to the vapid one.

The
The compound tinctures are very numerous; but we have words to express but six of them: 1. Aulter, which is astringent and bitter, as in the green and soft stones of grapes. 2. Acrab, properly so called, which is astringent and acid, as in the juice of unripe grapes. 3. Acris, which is pungent and hot. 4. Murantia, which is salt and pungent, as in common salt. Lixivious, which is saltiness joined with some pungency and heat. 6. Nitrous, which is saltiness joined with pungency and cold.

Taste constitutes one of the most obvious characters of bodies, and much is to be judged from it of the nature of many things. Dr. Abercromby, in a treatise partly written on this subject, has carried his observations so far, as to lay down a set of rules for the judging of any plant, or other body, without knowing what it is, merely from its taste, in regard to its virtues in medicine.

In order to judge of what he expressly means by the names of the several taints, it is proper to add the lift of them, with some of the things to which they are applied.

Plants, fruits, &c. are either four as the common sorrel, harsh as the meadar, saltire or rough as the quince, sweet as the fresh juice of ripe grapes, fat and oily as the fennamn, bitter as gentian or the wild cucumber, salt as common salt, tart as garlic, or, lastly, insipid as the gourd, or of some mixed taints, made of two or more of these.

The harsh or acerb taints are cold, repelling, and binding, hardly concocted, and they may all be known upon the tongue by their contracting or drying it. The aulter or rough things differ from these only in degree, as being somewhat milder in taint, and weaker in virtues.

The four or acid things are always cooling; but this never to excess, by reason of their penetrating parts: this taint is known by a biting on the tongue, but without any heat. Sweet things are all nutritive; and taking the word in its proper sense, they only have this quality. Their sweetnefs arises from their another being too hot nor too cold upon the tongue.

Salt things are moderately hot, and, on this account they all, in some degree, moisten and relax; but they also obstruct; they are known from the sweet things by filling, and, as it were, anointing the tongue, without giving that senfe of pleafure that the others do.

Salt things are astringent and detereive; the one quality they have from their earthy part, the other from their watery.

Bitter things may be very beneficial to the stomach; but, in improper cases, they may also do hurt. The pungent bitters, such as the elaterium, or wild cucumber, are all hurtful, unless rendered fafe by other means.

Tart things are hot, and often bad for the head, but good in heavy and phlegmatic constitutions: they are known by their heat in the mouth.

Lastly: insipid things in general have no peculiar quality, but are cold and watery; they are generally hurtful to the stomach, unless mixed with hotter and spicier things. Abercromby. Nov. Medici. Clavis.

It is observed by Sir John Floyer, that the taitfe is so good a judge for us, that all the chemical principles in plants may be discovered by it, before their distillation. All watery plants shew their phlegm, as well to the taitfe as by distilling; and in all dry woods, the taitfe discovers the earth they contain, as well as a chemical analysis; by the mucilaginous and gummy taitfe, and by the manifest oiliness in some plants, we distinguish their abounding in oil as well as by the retort. The smell also helps us greatly in an extemporary judging of plants, and we are able to declare upon the spot, that all the aromatic plants, and all the fetid ones, contain a large quantity of a volatile oil and taitfe. By the acrimony and pungency, we are well assured that there is a volatile taitfe in plants; and by the burning taitfe of others, we find that there is a corrosive taitfe in them. By a crude rough acridity, we distinguish the taittar or essential taitfe of plants to be in large quantity; but if the acid be of a vinious smell, we observe that it is of a middle state of digestion, and may be called a vinous taittar, and distinguished from the first; but, if the taittar have a pungent smell, then it is evidently a volatile taittar, or an acid acrid taittar.

The sweet taitles are more numerous in plants, and more varied among themselves than any other kind. These, in general, shew their oil by thin silmy smoothnefses, and their taittar is evident in their extracts, as is very plain in the common liquorice-juice.

The grasa-taints, as the common dogs-grafs, and the like, have much essential taitfe, and a moderate portion of oil; and the rusb, reed, horse-tail, and cats-tail, are all sweet and rough; some of these have more oil, and others more acid; and the most crude among them have more oil than taittar.

The corn-taints, as barley, rye, wheat, oats, millet, and rice, have much oil and essential taitfe, and a little volatile; fo bread, prepared of any of these, yields, on analysis, oil and effential and volatile taitfe.

It is to be observed here, that fermentation and fire severally produce a volatile taitfe, where it was not before, by subtilizing and volutionizing the essential taitfe; and the simly meallines in corn supplies the oil. The goats-beard and scorzonera-kind have the fame principles as the grases, much oil and essential taitfe. The sub-acerb taints, as rampions, campanulas, trachelia, and the like, contain much oil and essential taitfe; but the acrimony in these plants shews that they have also a volatile taitfe, and that in no small quantity; though Lemery, and the other chemical writers, have not observed this.

The ferns, polypodies, and all that class of plants, contain much oil and essential taitfe; but the chemists in general have omitted to mention an acrid principle in all these, which bespeaks a volatile taitfe; and fragrancy is observed in some of the harts-tongues, which bespeaks a volatile taitfe also, and volatile oil, though lithierto unobserved.

All the leguminous simly taints have more oil than taittar; but all of them have a large quantity of both. Beans, peas, and lentils, have also a volatile taitfe, as has also that strange fruit, eaten in Ruffia, and some other places, and called lentica aquatia by some; but by the botanical writers, tribulus aquaticus; the other name belonging to the common duck-weed. The aromatic legumes, such as melilot, have an exalted oil, and volatile taitfe. The honeysuckle is said by Lemery, and the other chemists, only to have an effential taitfe and oil; but as there is a highly aromatic flavour, and great acrimony, there must be also a volatile taitfe.

These are some few inftances, out of a very number re
cited by the author, for the reft of which we refer to the paper itself in N° 280 of the Transactions. Philos. Trans. N° 299, p. 1160. See Tasting.

Taste is also used, in a figurative fene, for the judgment and discernment of the mind.

We talk, and we hear every day of taste, of good taste, and of bad taste, and yet without well understanding what we mean by the word: in effect, a good taste feems to be little else but right reafon, which we otherwise express by the word judgment.

To have a taste, is to give things their real value, to be touched with the good, to be shocked with the ill; not to be dazzled with false appearances; but, in spite of all colours,
TASTE.

lores, and of every thing that might deceive or amuse, to judge foundly.

Taste and judgment then should be the same thing; and yet it is easy to discern a difference: the judgment forms its opinions from reflection; the reason, on this occasion, takes a kind of circuit to arrive at its end; it supposes principles, it draws confequences, and it judges; but not without a thorough knowledge of the cafe; so that after it has pronounced, it is ready to render a reason of its decrees. Taste observes none of these formalities; before it has time to consult, it has taken its resolution: as soon as ever an object is presented to it, the impression is made, and the sentiment formed; and we ask no more of it. As the ear is wounded with an harsh sound, as the smell is footed with an agreeable odour, before ever the reason has meddled with those objects, to judge of them; so the taste is struck at once, and prevents all reflection.

Reflections may come afterwards to confirm this taste, and discover the secret reasonings of its conduct; but it was not in its power to wait for them. Frequently, it happens not to know them at all; and what pains forever we use, we cannot discover what it was that determined it to think as it did.

This conduct is very different from that which the judgment observes in its decisions; unless we choose to say, that good taste is, as it were, a first motion, or a kind of instinct of right reason, which hurries us on with rapidity, and conducts us more securely than all the reasonings we could use. It is a first glance of thought, which discovers to us the nature and relation of things, as it was, by intuition.

In effect, taste and judgment are one and the same thing, one and the same disposition and habitude of the soul, which we call by different names, according to the different manners in which it acts; when it acts by sensation, by the first impression of objects, we call it taste; and when by reasoning, after having examined the thing by all the rules of art, &c. we call it judgment: so that one may say, taste is the judgment of nature, and judgment is the taste of reason.

Good taste, as defined by Madem. Scudery and Madem. Dacier, in an express treatise "Of the Corruption of Taste," is an harmony between the mind and reason; and a person has more or less of this taste, as that harmony is more or less just.

One might, perhaps, improve on this hint, and say, that good taste is nothing else but a certain ratio or relation between the mind, and the objects preferred to it: Right reason cannot but be moved and affected with things conformably to it, and wounded by those contrary: there is, then, a kind of sympathy, which unites them as soon as ever they meet; and at their union, their good underlayings discover each other.—Make a fine discourse; use only the richest and noblest expressions; if they contain an unhappy thought, or an incorrect reasoning, that thought, this reasoning, will immediately be felt by a person of taste; and the antipathy will shew itself by a movement of aversion, as sudden, as lively, and as natural, as that which nature inspires us withal for toads or spiders.

The term taste, used generally, is equivocal, and is used in at least three distinct acceptations. It sometimes means that peculiar mode of sensation, which resides in the tongue and palate; sometimes, the power of discrimination in the fine arts, or the feeling associated with it; sometimes, in a sense derived from the latter, it means liking or opinion in general.

It has been a subject of much controversy, whether taste, in the second sense, as we use the term in this article, be a distinct faculty, or merely a mode of judgment. The fact seems to be, says an anonymous writer, that pleasurable emotions are excited by certain objects or conceptions, and that, when we embody our feelings in words, we use expressions of comparison, and reference to a standard, as in other propositions. Feeling and judgment therefore concur; but to which the word taste should be peculiarly applied, it is not easy to determine. The primary sense of the word, and of its equivalents in modern languages, seems to imply the former, as the word criticism manifestly refers to the latter meaning.

Dr. Gerard, in his ingenious and elaborate "Essay on Taste," observes, that a fine taste is neither wholly the gift of nature, nor wholly the effect of art. It derives its origin from certain powers natural to the human mind, but these must be afield by culture, in order to attain their full perfection. Taste, according to this writer, consists chiefly in the improvement of those principles, which are commonly called the powers of imagination, and are considered by modern philosophers as internal or reflex senses, supplying us with finer and more delicate perceptions, than any which can be properly referred to our external organs. The simple principles of taste are the senses of novelty, of sublimity, of beauty, of imitation, of harmony, of ridicule, and of virtue. Any one of the internal senses, existing in vigour and perfection, forms a particular branch of taste, and enables a man to judge in some one subject of art or genius; but all of them must at once be vigorous, in order to constitute taste in its just extent. Taste will also derive considerable assistance from another principle, distinct from all the internal senses; and this is such a sensibility of heart or delicacy of passion, as fits a man for being easily moved, and for readily catching, as by infection, any passion that a work is fitted to excite, to which we might add the influence of casual associations on taste. Moreover, the most complete union of the internal senses is not of itself sufficient to form good taste, even though they be attended with the greatest delicacy of passion. They must be aided with judgment, the faculty which distinguishes things different, separates truth from falsehood, and compares together objects and their qualities.—Good sense is a indispensable ingredient in true taste, which always implies a quick and accurate perception of things as they really are; and, as the poet observes,

"Is, though no science, fairly worth the seven."

Taste, like every other human excellence, is progressive and improvable; and goodness of taste lies in its maturity and perfection; confiding, as Dr. Gerard says, in certain excellencies of our original powers of judgment and imagination combined. These may be reduced to four, viz. sensibility, refinement, correctness, and the proportion or comparative adjustment of its separate principles. All these must be in a considerable degree united, in order to form true taste. And this excellence of taste supposes not only culture, but culture judiciously applied. Want of taste unavoidably springs from negligence; taste from injudicious cultivation. Sensibility of taste, we are told, depends very much on the original construction of the mind, and is less improvable by use than any other of the qualities of good taste. Refinement or elegance of taste is chiefly owing to the acquisition of knowledge, and the improvement of judgment. Refinement of taste exists only, where to an original delicacy of imagination, and natural acuteness of judgment, is superadded a long and intimate acquaintance with the best performances of every kind. And as sensibility of taste disposes us to be strongly affected with whatever beauties or faults we perceive; and refinement of taste makes
makes us capable of discovering both, even when they are not obvious; so correctives of taste prevents our being imposed upon by taste appearances, and either approving shining faults, or condemning chaste virtues, and enables us to align every quality its due proportion of merit or demerit: thus distinguishing the various kinds, and measuring the different degrees of excellence and faultiness. The last finishing and complete improvement of taste, result from the due proportion of its several principles, and the regular adjustment of all its sentiments, according to their genuine value, so that none of them may engross our minds, and render us infensible to the rest. This due proportion of the principles of taste pre-supposes the correctives of each, and includes, besides, an enlargement and comprehension of mind. Dr. Gerard has also considered, how far taste depends on the imagination, evinced the connection of taste with genius, and the influence of taste on criticism, illustrated the objects and the pleasures of taste, and traced the effects of taste on the character and passions.

"Ingenius didicisse fideler alter ars, Emolit mores, nec finxit effe ferae."

Nothing is so improving, says Hume on the subject of delicacy of taste, to the temper, as the study of the beauties either of poetry, eloquence, music, or painting. They give a certain elegance of sentiment to which the rest of mankind are utter strangers. The emotions which they excite are soft and tender. They draw off the mind from the hurry of business and interest; cherish reflection; dispel to tranqulity; and produce an agreeable melancholy, which, of all dispositions of the mind, is the best suited to love and friendship. Besides, a delicacy of taste is favourable to love and friendship, by confining our choice to few people, and making us indifferent to the company and conversation of the greater part of mankind.

Taste, says Gerard, may be conceived as employing itself about nature, art, and science. With regard to nature, which is the common subject of the other two, taste and reason are employed in conjunction: as reason investigates the laws of nature, taste alone discovers its beauties. In art, taste is the ultimate judge, and reason but its minister. Scarcely any art is so mean, or so entirely mechanical, as not to afford subjects of taste. But the finer arts, which imitate the excellences of nature, supply it with more proper materials; and thence derive their merit. Music, painting, statuary, architecture, poetry, and eloquence, (to which may be added gardening, including the art of improving grounds, and the itage,) constitute its peculiar and domestic territory, in which its authority is absolutely supreme. In science, reason is supreme, but may sometimes reap advantage from using taste as an auxiliary which serves to judge, not only of the manner in which science is communicated, but also of the subject-matter itself.

To this effay of Dr. Gerard are annexed three dissertations on the same subject; one by Voltaire; another by M. D'Alembert, read before the French academy in 1757, and intended to shew the great advantages of philosophy in its application to matters of taste, and to justify it from the accusations that have been brought against it by ignorance and envy; and the third is a Fragment of Montefquieu.

We observe, that the arts above enumerated, are distinguished from those that are merely mechanical, as well as from the speculative sciences, by this circumstance; that their main end is neither utility, in the common sense of the word, nor instruction; but to minister to the pleasures of the imagination, by means of words, or of sensible images, or of both of these combined. But their most eminent characteristic, perhaps, which runs through all of them, is, that many of their principles, though in one force found upon nature, since their only object is to delight the imagination of men, are not derived from ordinary nature; but require a good deal of attention, and the formation of habits, before they can be relished or understood. When we say, that these eight arts are the proper objects of taste, we do not intimate that their principles are altogether in common; or that he who is thoroughly acquainted, e.g., with the theory of painting, will be necessarily a good judge of poetry or architecture; since all of them have many rules originally arbitrary, the accurate knowledge of which has become indispensable to the man of taste; and which, in many cases, fuggels pleasures to the imagination, not inferior to those which appear more directly natural. Nevertheless, a man who has applied the accuracy of discrimination, delicacy of feeling, and habitual reference to an original standard, in which the exercice of taste confits, to any one of those arts, can hardly fail, by sufficient attention and experience, to become a judge of all the rest. This observation, however, is liable to some exceptions, particularly in reference to music, which no one whole ear is naturally imperfect, will ever be able to understand. After all it must be allowed by those who maintain the necessity of admitting principles and a standard of taste, that a prodigious difference will be found to remain in the sentiments of mankind, with regard to matters of taste; and this diversity of sentiment in judging concerning the productions of art, may be ascribed to three causes; viz. want of feeling, or inability to enjoy, in any great degree, the pleasures of the imagination, as in the instance to which we have above alluded; want of knowledge, because, as the principles of the fine arts are founded partly on general nature, and partly on arbitrary rules, no just judgment can be formed of their general nature without much attention and experience; and the arbitrary rules pertaining to all the arts are numerous and complicated, and easily confounded by unskilful judges; and further, hasty or precipitate or decision, by which men are often misled. Having already remarked, that the laws of taste are partly natural, and partly arbitrary, we here fuggel, that under the former fall, in poetry and eloquence, whatever fuggels associations generally delightful and interesting, or awakens sympathies, which the constitution of mankind leads them to feel; in painting, truth of imitation, and forcibleness of expression; in music, gratification of the ear and power over the affections. Under the latter may be reckoned, what is called, style in writing, and the observance of those rules with which critics are conversant, in the other arts. Besides, independently of principles of approbation and disapprobation which exist in the objects of taste, all men are more or less influenced by circumstances peculiar to themselves; and to this class belongs a variety of accidental associations.

A late excellent writer has defined taste to be the power of receiving pleasure from the beauties of nature and of art. Though taste, says this writer, be ultimately founded on a certain natural and instinctive sensibility to beauty, yet reason asills taste in many of its operations, and serves to enlarge its power. In this sense, it is a faculty common in some degree to all men. Quinckilian, however, (Instit. lib. vi. c. 2.) seems to include taste under what he calls judicium. The characters of taste, when brought to its most perfect state, are all reducible to two, delicacy, which principally respects the perfection of that natural sensibility on which taste is founded; and correctives, which chiefly respects the improvement that faculty receives through its connection with
the understanding: the former of these qualities is more the gift of nature; the latter more the product of culture and art. Among the ancient critics, Longinus poiseffed most delicacy; Aristotle most correctness. Among the moderns, Mr. Addison is a high example of delicate taste; and dean Swift, if he had written on the subject of criticism, would perhaps have afforded the example of a correct one. In determining the standard of taste, those who say that nature is this standard, lay down a principle very true and just, as far as it can be applied; nevertheless, conformity to nature is an expression very often used, without any distinct or determinate meaning; in a more clear and precise sense, nothing can be considered as the standard of taste, but the taste, as far as it can be known, of human nature. That which men concur the most in admiring, must he held to be beautiful. His taste must be esteemed just and true, which coincides with the general sentiments of men. In this standard we must rest. To the sense of mankind the ultimate appeal must ever lie, in all works of taste. But this sense is founded on those principles of reason and found judgment, which are applicable to matters of taste: and yet the ultimate conclusions to which our reasonings lead, refer at last to sense and perception. Accordingly it is observed, that the difference between the authors who found the standard of taste upon the common feelings of human nature, ascertained by general approbation, and those who found it upon established principles, which can be ascertained by reason, is more an apparent than a real difference. For they who lay the greatest stress on sentiment and feeling, make no scruple of applying argument and reason to matters of taste; they appeal to established principles, and plainly shew that the general approbation to which they ultimately recur, is an approbation resulting from diffusion as well as from sentiment. And they, on the other hand, who, in order to vindicate taste from any suspicion of being arbitrary, maintain that it is ascertainable by the standard of reason, admit, nevertheless, that what pleases univerally, must on that account be held to be truly beautiful: and that no rules or conclusions concerning objects of taste, can have any just authority, if they be found to contradict the general sentiments of men.

However, it is not pretended, that there is any standard of taste, to which, in every particular instance, we can refer for clear and immediate determination. But it is sufficient to conclude, that taste is far from being an arbitrary principle, which is subject to the fancy of every individual, and which admits of no criterion for determining whether it be false or true. Its foundation is the fame in all human minds. It is built upon sentiments and perceptions, which belong to our nature; and which, in general, operate with the same uniformity as our other intellectual principles. When they are perverted by ignorance or prejudice, they are capable of being rectified by reason. Their found and natural state is ultimately determined by comparing them with the general taste of mankind.

The ingenious writer to whom we are indebted for the preceding observations, has distinguished between taste and genius. See Genius.

Mr. Allison has treated the subject of this article with so much ingenuity and elegance, in his "Elfin on the Nature and Principles of Taste," that it would be almost sufficient, without further enlargement, to refer to his excellent performance.

According to this much approved writer, the perception of the qualities that are denominated beautiful and sublime in the works of nature and art, is attended with an emotion of pleasure, very distinguishable from every other pleasure of our nature, and to which is appropriated the name of the "emotion of taste." Accordingly, the distinction of the objects of taste into the sublime and beautiful, has produced a similar division of this emotion into the "emotion of sublimity," and the "emotion of beauty." The qualities that produce these emotions occur amid every variety of external scene, and among many diversities of disposition and affection in the mind of man. The most pleasing arts of human invention are altogether directed to their pursuit, and even the necessary arts are exalted into dignity by the genius that can unite beauty with use.

Our author, in his prosecution of this subject, first investigates the nature of those qualities that produce the emotions of taste, and then the nature of the faculty by which these emotions are received. He observes, that the theories which have been formed in relation to this subject have uniformly taken for granted the simplicity of this emotion, and have referred it to some one principle or law of the human mind; and have therefore concluded, that the discovery of that one principle was the essential key by which all the pleasures of taste were to be resolved. These theories are arranged, in consequence of the assumption of this fundamental principle, into two classes of supposition: one, which reduces the "emotion of taste" directly into an original law of our nature, which supposes a sense, or senses, by which the qualities of beauty and sublimity are perceived and felt, as their appropriate objects; and hence concludes, that the genuine object of the arts of taste is to discover and to imitate those qualities in every subject, which the prescription of nature has thus made essentially either beautiful or sublime. To this first class of hypotheses belong almost all the theories of music, architecture, and sculpture, the theory of Mr. Hogarth, of the abbe Winkelman, and, perhaps, in his last refort, also the theory of Sir Joshua Reynolds; and of all those who attend more to the causes of these emotions, than to their nature. The second class of hypotheses refits the idea of any new or peculiar sense, distinct from the common principles of our nature; which supposes some one known and acknowledged principle or affection of mind to be the foundation of all the emotions we receive from the objects of taste; and, therefore, resolves all the various phenomena into some more general law of our intellectual or moral constitution. Of this kind are the hypotheses of M. Diderot, who attributes all our emotions of this kind to the perception of relation; of Mr. Hume, who resolves them into our sense of utility; of the venerable St. Austin, who, with nobler views, one thousand years ago, resolved them into the pleasure which belongs to the perception of order and design, &c. This hypothesis has been adopted by rational and philosophic minds: by those who have been led by their habits to attend more to the nature of the emotions they felt than to the caufes which produced them. Mr. Allison, pursuing an analysis of the effect which is produced upon the mind, when the emotions of beauty or sublimity are felt, concludes that it is very different from the determination of a "sense;" that it is not a simple but a complex emotion; that it involves, in all cases, the production of some simple emotion, or the exercise of some moral affection, and the consequent excitement of a peculiar exercife of the imagination; that these concomitant effects are distinguishable, and very often distinguished in our experience; and that the peculiar pleasure of the beautiful and sublime is only felt when these two effects are conjoined, and the complex emotion produced.

Our author having investigated the causes which produce this effect, or, in other words, the sources of the beautiful and sublime in nature and art, and having shown that there is
TASTE.

An single emotion into which these varied effects can be resolved; but, on the contrary, that every simple emotion, and therefore every object capable of producing any simple emotion, may be the foundation of the complex emotion of beauty or sublimity; and that this complex emotion is never produced, unless, besides the excitement of some simple emotion, the imagination also is excited, and the exercise of the two faculties combined in the general effect:—proceeds to show what is that "law of mind," according to which, in actual life, this exercise of imagination is excited, and what are the means by which, in the different fine arts, the artist is able to awaken this important exercise of imagination, and to exalt objects of simple and common pleasure into objects of beauty and simplicity. In the last place, he investigates the nature of that faculty by which the emotions described by him are perceived and felt. This he shows has no resemblance to a sense; wherever it is employed, two distinct and independent powers of mind are engaged, so that it is not to be considered as a separable and peculiar faculty, but to be finally resolved into some general principles of our constitution. These speculations further lead to the important inquiry, whether there is any standard by which our sentiments on these subjects may be determined; to an explanation of the means by which taste may be corrected or improved; and to an illustration of the purposes which this peculiar constitution of our nature serves; in the increase of human happiness, and the exaltation of human character. Our limits will not allow any further abstract or abridgment of this valuable work; and we must refer those readers who wish to pursue disquisitions of this kind to the work itself, in 2 vols. edit. 4, 1815.

"We cannot forbear citing some pertinent remarks, that are presented to our notice by a living writer of distinguished celebrity, professor Dugald Stewart. Taste, says this author, is not a simple and original faculty, but a power gradually formed by experience and observation. It implies, as its ground-work, a certain degree of natural sensibility; but it implies also the exercise of the judgment, and is the result of an attentive examination and comparison of the agreeable and disagreeable effects produced on the mind by external objects. In tracing the progress of taste from rudeness to refinement, we find an analogy to the progress of physical knowledge from the superlatives of a savage tribe to the investigation of the laws of nature, founded on the supposition, that, as in the material world there are general facts beyond which philosophy is unable to proceed, so, in the constitution of man, there is an inextricable adaptation of the mind to the objects with which his faculties are conversant, in consequence of which, these objects are fitted to produce agreeable or disagreeable emotions. In both cases, reasoning may be employed with propriety to refer particular phenomena to general principles: but in both cases, we must at last arrive at principles of which no account can be given, but that such is the will of our Maker. In matters of taste it should be considered, that the tendency to casual association is much stronger than it commonly is, with respect to physical events; and when such associations are formed, they are not so likely to be corrected by mere experience, unafflicted by flux. Hence some have erroneously supposed, that association is sufficient to account for the origin of the notions we form concerning matters of taste; and that there is no such thing as a standard of taste founded on the principles of the human constitution. Whenever, says our author, association produces a change in our judgments on matters of taste, it does so by co-operating with some natural principle of the mind, and implies the existence of certain original sources of pleasure and unaccusaleness. The circumstances which please, in the objects of taste, are of two kinds: 1. Those which are fitted to please by nature, or by associations, which all mankind are led to form by their common condition; and, 2dly, Those which please in consequence of associations arising from local and accidental circumstances. Hence we derive two kinds of taste, the one enabling us to judge of those beauties which have a foundation in the human constitution; the other, of such objects as owe their principal recommendation to the influence of fashion. These two kinds of taste are not always, indeed rarely, united in the same person. The perfection of the one depends upon the degree in which we are able to free the mind from the influence of casual associations; that of the other, on the contrary, depends on a facility of association, which enables us to fall in, at once, with all the turns of the fashion, and (as Shakespeare expresses it) "to catch the tune of the times." For the author's application of his principles and remarks to the subject of language, which affords numberless instances to exemplify the influence which the association of ideas has on our judgments in matters of taste, we must refer to his own valuable work. See Dr. Blair's Lectures on Rhetoric, and Belles Lettres, vol. i. Lect. ii. and iii. See also Hume's Essay of the standard of taste, in his Essays, &c., vol. i. eff. xxiii. p. 253, ed. 1764. Stewart's Elements of the Philosophy of the Human Mind, part ii. ch. v. § 2. Knight's Analytical Enquiry into the Principles of Taste, 8vo. 1805. Alison on Taste, 2 vols. 8vo. 1815. Edin. Rev. N° XIV.

Taste, in Music, is often confounded with graces, or change of palliages; but a movement composed in good taste, is often injured by what are called graces. We rather suppose taste to depend on feeling and expression, than on flourishes, or, as the Italians call them, risormenti; in sorrow, pathos; in joy, brilliancy and fire. Yet when changes and embellishments are necessary, good taste is likewise requisite in their choice and application. The composer discovers his taste by his melodies, as much as the performer by expressing his thoughts.

Taste, says Roufeau, is of all Nature's gifts the most easily felt, and the most difficult to explain; it would not be what it is, if it could be defined: for it judges of objects beyond the reach of judgment, and serves, in a manner, as a magnifying glass to reason.

There are some melodies more agreeable than others, though equally well phrased and modulated; there are combinations in harmony of great effect, and others that excite no attention, all equally regular as to composition; there is in the texture of the parts, an exquisite art of arranging and setting off one palliage by another, which depends on something more subtle than the laws of contrivance.

Genius creates, but taste selects. Genius is often lavish and redundant, and in want of a severe critic to prevent him from the abuse of his riches. Many great things may be achieved without taste; but it is taste that renders them interesting. It is taste which enables a vocal composer to seize and express the ideas of the poet; it is taste which guides the performer to the true expression of the composer's ideas; it is taste which furnishes both with whatever can embellish and enrich the subject; and it is taste which enables the hearer to feel all these perfections. Taste is, however, not mere-felicity. A cold heart may have much taste; and a man transported with things truly spirited and impassioned, is little touched by grace and elegance. It seems as if taste attached itself to minute refinements, and felicities, to grand and sublime effects.

Taste in singing and playing; Gout du Chant, Fr. According to Roufeau, there was, in his time, in France, a
person distinct from the noise-maker, to teach the necessary 
augmentums or graces thought necessary to cover, in some 
degree, the infipidity of French melody. Most of the young 
students in music used therefore to have two masters, one 
for music and one for taste, called Maître de Gout-de-chant.
Gout-de-chant likewise confined in imitating or taking-off 
the voice and manner of a particular finger; which is 
always done by exaggeration. The face of a man with 
a mole or wart upon it, is of great use to a portrait painter 
in fixing a likeness; so a finger, with a little tendency to 
nafivity, to coarseness, to tingling through the throat, or of 
quivering upon one note in attempting to make, which the 
Italians have well denominated toffe di capro, a goat’s cough, 
are easily taken off.

TASTINA, in Ancient Geography, a town of Asia, in 
the Greater Armenia, between Sirta and Cazaraa. Ttod.
TASTING, the sense by which we distinguish favours; 
or the perception which the soul has of external objects, 
by means of the organs of taste.

Authors differ much as to the organ of tasting. Bauhin, 
Bartholin, Verriogius, &c. place it in the laver. ilegy parts 
of the tongue; Dr. Wharton, in the glands at the root of 
the tongue; Laurentius, in the thin tunic covering the 
tongue; others in the palate, &c. But the great Malpighi, 
and after him all the latest writers, place it in the papilla 
chiefly lying about the tip and sides of the tongue. See 
TONGUE.

These papillse arise from the corpus nervosum, which 
covers the muscular flesh of the tongue; whence, passing 
through the corpus reticulare, they stand up under the 
external membrane of the tongue, creft, and covered with 
vaginje, or the skin of the said membrane, to defend them 
from objects too violent. These vaginse are porous, and 
flick out so far, that when the aliment is squeezed, they 
enter with the fare to receive the object, or the matter of 
taste.

These papillae Boerhave conjectures to arise from the 
ninth pair of nerves; and these, he afferts, are the only 
organ of taste: the others, whether of the tongue, palate, 
or jaws, &c. he observs, contribute nothing to them; 
though probably those of the cheeks next the dentes 
molares may.

The object of tasting, is any thing, either in animals, 
vegetables, or minerals, from which salt or oils may be 
extracted.

Tasting, then, is performed by the objects being attenu-
ated and mixed with saliva, warmed in the mouth, and ap-
ted to the tongue; where, infinuating into the pores of 
the membraneous vaginje of the nervous papillae, and pen-
etrating to the surface of the papillae themselves, it affects 
and moves them: by which means a motion is communi-
cated along the capillaments of the nerve to the common 
semssey, and an idea excited in the mind, of salt, acid, 
sweet, bitter, hot, aromatic, astringent, &c. the like; accord-
ing to the figure of the particles that strike the papilla, 
or the disposition of the papilla to receive the impulse.

The taste, considerd in a medical view, may be dimi-
nified by cruals, slith, mucus, aphthae, pellicles, warts, &c. 
covering the tongue: it may be depraved by a fault of the 
saliva, which, being discharged into the mouth, gives the 
same fenation as if the food which the person takes had 
really a bad taste; or it may be entirely destroyed by in-
juries done to the nerves of the tongue and palate. Few 
things prove more hurtful, either to the sense of tasting or 
smelling, than obstinate colds, especially those which affect 
the head. When the taste is diminished by slith, mucus, 
&c. the tongue ought to be scraped, and frequently washed 
with a mixture of water, vinegar, and honey, or some 
other detergent. When the saliva is vitiated, which seldom 
happens, unless in fevers or other disaeses, the curing of 
the disorder is the cure of this symptom. To relieve it, how-
ever, in the mean time, the following things may be of use: 
if there be a bitter taste, it may be taken away by vomits, 
purges, and other things, which evacuate bile: what is 
called a nidorous taste, arising from putrid humours, is 
corrected by the juice of citrons, oranges, and other acids: 
a salt taste is cured by plentiful dilution with watery liquors: 
an acid taste is destroyed by absorbents, and alkaline fats, 
as powder of oyster-shells, salt of wormwood, &c. When 
the sensibility of the nerves, which supply the organs of 
taste, is diminished, the chewing of horse-radish, or other 
stimulating substances, will help to recover it.

TASTINESS, in Geography, a cape on the N. of the island 
of Sandy. N. lat. 50° 10’. W. long. 2° 20’.

Tasto Solo. These two Italian words, written over or 
under a bafe to folos that are figured, generally at a pause, 
or preceding a close, imply that the accompanier on a key-
instrument ought to play no chords with the right hand; 
but only to strike the base note with the left hand, which 
is implied by the word tasto solo, a single key; or at moft 
to double that found with the right hand in the octave; as 
it is hardly possible to divine or figure the harmony of an 
ad libitum or cadence, either written or played extempore, 
where the composer or the performer is allowed to write or 
play on these occasions. Solos are now no longer in fashion; 
but the violin folos of the early part of the last century, by 
Corelli, Geminiani, Somis, and Tartini, have all clofes of 
this kind, to which the bafe is confined to a single note, or 
tasto solo.

TATA, or Dotis, in Geography, a town of Hungary, 
built in the midst of water and swamps, with a castle; 20 
miles W. of Gran.

Tata Yenca, in Botany, a name used by some for the tree 
which yields what the dyes call the suffice, or yellow wood 
used in dyeing.

TATACUL, in Geography, a town of Hindoostan, in 
Mylore; 11 miles N. of Vencaffigery.

TATALISCA, a town of Africa, in Galam, on the 
Senegal; 60 miles W. of Galam.

TATAPARY, a town of Hindoostan, in the province of 
Timovely; 15 miles N.E. of Palamcotta.

TATAPATNAM, a town of Hindoostan, in Bar-
maul; 22 miles S.E. of Darenteory.

TATAR BASSARDSCHI, a town of European Turkey, 
in Romania, on the Mariza; 16 miles N.N.W. of Filippopo-

TATAR BUMAR, a town of European Turkey, in Bebla-
rabia; 32 miles S.W. of Akerman.

TATARSKOI, a fort of Russia, in the government of 
Kolivan, on the E. side of the Irilich. N. lat. 53° 44’; 
E. long. 85° 34’.

TATENAGUR, a town of Hindoostan, in the Carnar-
tic; 6 miles S.W. of Devicotta.

TATENAY, the chief town of the island Gilolo; which 
fee.

TATH, in Old Law, a privilege which some lords of 
manors enjoyed, of having their tenants’ sheep folded at 
night.
night on their demeuse lands, for the improvement of the ground.

TATI, in Agriculture, a term applied by flock-farmers, in some situations, to all such grafts as are particularly rank and luxuriant, and which have a tendency to induce the root in sheep.

They commonly distinguish two kinds of it; namely, the water-tatt, which arises and proceeds from an excess of moisture; and the voli-tatt, which is the produce of dung. The latter, it is said, is darker coloured than the former; but that their softness, luxuriacy, and tendency to produce the root in the animals, are nearly the same. The water-tatt is noticed to be the produce of either lands naturally too moist, of wet peasants, or accidental or artificial floodings of them, or of some other such causes. Nothing is so apt, it is supposed, to produce the root in these animals, as the grafts which grow in low marshy grounds, in what is called avad lands, and that around the heads of springs, especially on the north side of hills, innumerable, indeed, that such pastures were formerly considered as naturally rotten, and of course rejected by all intelligent sheep-farmers.

In short, wherever a very soft and tender thist suddenly rushes up in thistle-pasture lands, there is always much danger of its effects; and as dung greatly promotes the growth of very rank thist, the pernicious consequences of such noilt tatt are to be remedied, by not allowing horses or neat cattle to pasture among the sheep.

TATHAA, in Geography, a river of Africa, which runs into the Indian sea, S. lat. 28° 20'.

TATHILBA, in Ancient Geography, a town of India, on this side of the Ganges, which belonged to the Bithamal Ptolemies.

TATIAMBETTY, in Geography, a town of Hindoostan, in Myfore; 5 miles N. of Wombillere.

TATIAN, in Biography, a native of Alphyria, from which circumstance he is sometimes called "the Alphyrian," and an ecclesiastical writer, who, according to Cave, flourished about the year 173. He was originally a heathen, and by profession a sophist, and teacher of rhetoric. His reading appears to have been extensive, and he is allowed to have been well acquainted with Grecian literature and philosophy.

After his conversion to Christianity, he became a disciple of Justin Martyr, to whom he was attached, and of whom he speaks with great respect. He accompanied this father to Rome, and travelled through different countries with a view to his improvement. But some time after Justin's death, which happened about the year 165, he adopted a number of absurd opinions. Accordingly he is charged, and probably not without reason, with being the founder of the sect of the Encratites; he condemned the use of wine, and denied the lawfulness of marriage, the reality of Christ's sufferings, and the salvation of Adam. He also embraced the Aeon of Valentinus, and affeeted with Marcion that there are two gods. Eusebius dates his heresy about the twelfth year of the emperor Marcus Antoninus, or the year 172. But however erroneous were his principles in the latter part of his life, his works afford us satisfactory evidence of the antiquity and high esteem of the gospels in his time. After propagating his doctrines for some years in Rome, he opened a school in Meopotamia, about the year 172: and he is said to have preached at Antioch, and in some other places. The time and place of his death are not known. He appears to have written a considerable number of books, one of which, still extant in Greek, and entitled "Oratio ad Graecos," or Oration against the Gentiles, was either an apology for Christianity, or an attack on Heathenism. This was first printed at Zurich in 1546, with the Latin version of Conrad Gellner. It is annexed to the edition of Justin Martyr's works, and those of other fathers: but the best edition is that of Worth, Greek and Latin, Oxon. 1700, 8vo. His design in this work, which displays great learning, was to prove that the Greeks were not the inventors of any of the feincenes, but that they were indebted for their acquaintance with them to those whom afterwards they denominated Barbarians. This work, according to Brucker, everywhere where breathes the spirit of the Oriental philosophy, the leading tenets of which he details; and he seems to have adopted several of the opinions of Plato, and of the Alexandrian Platonists, concerning the creation of the world by the Logos, and its animation by a subordinate spirit; concerning the existence of demons in material vehicles, who occupy the aerial regions, and that of zeus, who reside above the stars. He also held with Plato the perfection of matter as the cause of evil, and thence he inferred the meritouriousness of rising above corporeal appetites and passions. Another work of Tatian, cited by St. Clement, was entitled "Perfection according to the Saviour," in which he argued against marriage. Eusebius cites another work composed by Tatian, which was a "Book of difficult questions, for the explanation of several obscure places of Scripture." We have an account of a Latin work ascribed to Tatian, called "Harmony" or "Dia-Tarifon" of the Four. But some approved writers have doubted whether we have one copy of Tatian's Harmony now extant. Dr. Lardner has investigated this subject with his usual judgment and impartiality; and he inclines to the opinion, that we are in possession of this work; and he thinks that the commentator written upon it by Ephrem, the Syrian, afford reason for concluding that it was not so contemptible or so heretical as some have thought. This Harmony is shorter than that attributed to Ammonius, and contains a compendious history of our Lord and Saviour Jesus Christ, taken out of the four Gospels. It consists of four parts; the first is a kind of introduction, containing the history of our Lord's nativity, and the former part of his life; the other three parts are the three years of our Lord's ministry. Brucker by Enfield, Lardner's Works, vol. ii.

TATIANITES, TATIANITES, in Ecclesiastical History, a sect of ancient heretics, thus called from Tatian, a disciple of Justin Martyr.

This Tatian, who has the character of one of the most learned men of all antiquity, was perfectly orthodox during the life of his master. He was, like him, a Samaritan, by nation, not by religion, as Eiphimias seems to intimate. They both belonged to the Greek colonies which were spread throughout the country of the Samarians.

Justin being dead, Tatian is said by some to have inclined to many of the errors of the Valentinians; but Molheims says, that his doctrine approached nearer to that of the oriental philosophy concerning the two principles. He adds, that it appears from the testimony of credulous writers, that Tatian looked upon matter as the foundation of all evil, and therefore recommended, in particular manner, the mortification of the body; that he distinguished the creator of the world from the Supreme Being, and denied the reality of Christ's body; and corrupted the Christian religion with several other tenets of the oriental philosophy. (See the preceding article.) He had a great number of followers, who were, after him, called Tatianites; but were nevertheless more frequently distinguished from other sects, by names relative to the authority of their manners. For as they rejected, with a sort of horror, all the comforts and conveniences of life, and abstained from wine with such a rigorous obstinacy, as to use nothing but water, even at the celebration of the Lord's supper, as they macerated their bodies by continual fasting, and lived a severe life of celibacy.
celibacy and abstinence; so they were called Eunuchitae, or temperate; Hydroparaeites, or drinkers of water; and Apotocites, or renouncers. Moth. Eccl. Hist. vol. i.

TATIANSKAIA, in Geography, a fort of Russia, in the government of Saratov, on the Volga; 12 miles S.E. of Tarasitza.

TATEN, a town of Chinese Tartary; 55 miles N.E. of Tam-fau.

TATILLUM, in Ancient Geography, a town of Africa, in Mauritania Cæsarea, on the route from Carthage to Cæsarea, between Arca and Ausa. Anton. Tin. TATISCHEVA, in Geography, a fortress of Russia, and the government of Upha, on the Ural; 28 miles W. of Orenburg.

TATISM Kon, a mountain of Persia, in the province of Irak; 12 miles N. of Com.

TATIUS, Aelilides, in Biography, a Greek writer of Alexandria, is supposed to have lived in the latter part of the third century. He is known to us as the author of a work on the Sphere, of which there remains a fragment, being an introduction to a commentary on the Phenomena of Aratus. A copy of this from a MS. in the Florentine library, by Peter Victorius, was printed. It was afterwards translated into Latin by Peter, under the title of "Hagyga in Phenomena Arati." We learn from Suidas, that Tatius also wrote "Erotics," in which he includes "the Loves of Lucippe and Clitophon." This work is preserved, and affords one of the examples of Greek romance. The Latin version of it was made by Anibal Cruscus, and published at Bafle in 1554. The latest edition of this piece is that of Bodem, Greek and Latin, Lips. 1776, 8vo. It is elegantly written, but of a licentious cast; and hence it has been inferred that the author was a heathen, when he composed it; but Suidas affirms, that he afterwards became a Christian, and attained to epicacy.

TATNALL, in Geography, a county of the state of Georgia.

TATOBIT, a town of Bohemia, in the circle of Boleflau; 5 miles E. of Tornau.

TATOU-CHE, a town on the W. coast of the island of Formosa. N. lat. 24° 38'. E. long. 119° 58'.

TAT-SIN, a river of China, which runs into the sea, N. lat. 37° 46'. E. long. 118° 16'.

TATTA, is supposed to be at or near the ancient Pattala, a town of Aha, which, before the building of Hyderabad, was considered as the chief city of Scind, was founded, according to the tradition of the natives, in the 906th year of the Hegira, and stands on a rising ground, four miles W. of the Indus. It has fill a population of 18,000 souls, and is about four miles and a half in circumference. Its wall, constructed for its defence, is now in ruins. The houses of the higher rank are built of bricks, but those of the lower clafs of wood, plastered with mud. The remains of the mosques, and other handomie edifices of this city, are evidences of its former prosperity; and although on the decline, it enjoys a considerable trade. Its trade is much diminished, on account of the bad government of Scind or Sindy, and the hoiffe or rapacious dispossession of the Seiks, the present possessors of the countries of Mouttan and Lahore. The country in the vicinity is a fine rich soil, being watered by canals drawn from the river. Agriculture, however, is much neglected, and the inhabitants of Tatta indicate extreme poverty and wretchedness. To the north of the city is a range of hills, extending several miles in a northerly direction; and to the south is also a range of Table land, reaching almost to the banks of the Indus. Boats trading to Tatta come no farther than Begemab, a village at the distance of about five miles. The river at this place is about a mile in breadth, and four fathoms in depth in the deepest parts. N. lat. 24° 44'. E. long. 68° 17', as stated in Kinneir's account of Perfia; but according to major Rennell, N. lat. 24° 50'. E. long. 67° 37'.

TATTAH, a town of Africa, on the frontiers of Drah and Morocco, in the route from Morocco and Sufe to Tombutoo; 170 miles S.S.E. from Morocco. N. lat. 28° 25'. W. long. 6° 15'. Tatth and its territory contain 10,000 inhabitants. Jackson's Morocco.

TATTAHAR, a town of Bengal; 13 miles N. of Turee.

TATTAMUNGALUM, a town of Hindooftan, in Calicut; 5 miles S. of Palticaudery.

TATTAR, See Yool.

TATTARAN, a small island in the Sooloo Archipelago. N. lat. 6° 10'. E. long. 121° 58'.

TATTSHELL, a small market-town in the wapentake of Garthwe, Lindsey division of the county of Lincoln, England, is situated on the river Bain, near its junction with the Witham, 9 miles S.S.W. from Horncastle, and 130 miles N. from London. The manor was granted by William the Conqueror to Eudo, one of his Norman followers, whose descendants assumed the name of Tattershall, from this place. Robert Fitz-Eudo obtained a grant from king John, for the inhabitants of the town to hold a weekly market; and another of the family, in the time of Edward III., received the royal licence to erect a caflle within his manor of Tattershall. But the present freetown was built by Sir Ralph, afterwards lord Cromwell, treasurer of the Exchequer to Henry VI. The castle and manor were granted by Henry VII. to Margaret, countess of Richmond, and entailed on the duke of Richmond; who dying without issue, they were granted by Henry VIII. to the duke of Suffolk; and in the next reign passed to Edward, lord Clinton, afterwards earl of Lincoln. By marriage with an heir of the Clintons, they are now in the possession of lord Fortescue. The caflle stands on a level moor, and is surrounded by two great fosses, the outer one formed of earth, and the inner faced with brick, ten feet deep. It was originally intended as a place of defence, and was progressively raised to great height and extent. In the civil wars it was, however, dilapidated. Till very lately the principal gateway was remaining: the part at present left standing, is a square tower of brick, flanked by four octagonal embattled turrets, which are crowned with spires covered with lead. It was divided into four stories. The main walls were carried to the top of the fourth story, where a capacious machicolation surrounded the tower, on which there is a parapet wall of great thicknerss. This was to protect the persons employed at the machicolations. The tower is constructed upon ponderous groined arches, which support the ground-floor. Near the outer most stands the parish church, a beautiful and spacious edifice, built in form of a croft. Few churches, perhaps, have suffered more dilapidations than this. It consisted of a nave, having five large arches on a side, and eight clerestoried windows, placed in pairs; on each side is a transept, and a magnificent chio. The windows of the latter were glazed with stained glafs, which was removed, by a late earl of Exeter, to the chapel of Burleigh, on condition that he replaced it with plain glafs, which could have been done for the sum of forty pounds; but this being neglected, the inside has suffred greatly from the weather; although the walls, roof, and pavement remain almost entire. The ruined screen and talls of wood, richly carved, are almoft rotten: behind it is a stone screen, in the arches of which are painted figures. The body of the church and transepts had their windows richly adorned with the legendary hitories.
histories of Roman saints. Before the altar lay two rich brass figures of Ralph, lord Cromwell, who died in 1455, and of Margaret his wife, who died in 1453. This nobleman, in the seventeenth year of Henry VI., obtained a licence to make the church of Tatterhall collegiate, for a mفاعل or warden, fix priests, fix secular clerks, and fix choristers. He also founded, near the church-yard, an hospital or alm-houf¢e, for thirteen poor men and women. At the dissolution, the collegiate revenues were granted to Charles, duke of Suffolk. The hospital still remains, with a small endowment. The population report of the year 1811, stated that Tatterhall contained 566 inhabitants, occupying 103 houses. The market is held on Tuesdays, and there are three fairs annually.—Beauties of England and Wales, vol. ix. Lincolnshire, by J. Britton, F.S.A. History, &c. of Tatterhall, with plates, 8vo. 1801.

TATTICOMBA, a town of Hindooftan, in Mysore; 4 miles N. of Dindigul.

TATTO, Ital. from Tatius, Lat. in Music, implies a measure, or bar, the period when the hand or foot is beaten down in marking the time. See TACITUS, and BATTUTA.

Tattoo, q. d. Tap-to, a beat of a drum, at night, to advertise the fitters to retreat, or repair to their quarters in a garri-son, or to their tents in a camp. See Retreat.

TATTOOING, in Modern History, a name given at Otheaite, and other islands of the South Sea, to the operation of staining the body. For this purpose they prick the skin, so as not to fetch blood, with a small instrument, somewhat in the form of a hoe, or blade of a saw; that part which answers to the blade is made of a bone or shell scraped very thin, and from a quarter of an inch to an inch and a half wide: the edge is cut into sharp teeth or points, from the number of three to twenty, according to its size. When this is to be used, they dip the teeth into a mixture of a kind of lamp-black, formed of the smoke that rises from an oilly nut which they burn instead of candles, and water, or charcoal-dust diluted with water; the teeth, thus prepared, are placed upon the skin, and the handle to which they are fastened, being fluck by quick smart blows, with a flick fitted for the purpose, they pierce it, and at the same time carry into the puncture the black composition, which leaves an indelible stain. This operation is performed upon the youth of both sexes, when they are about twelve or fourteen years of age, in several parts of the body, and in various figures, according to the fancy of the parent, or perhaps the rank of the party. The women are generally marked with this stain in the form of a Z, in every joint of their fingers and toes, and frequently on the outside of their feet: the men are also marked with the same figure; and both men and women have figures, circles, crescents, and ill-defined representations of men, birds, or dogs, and various other unintelligible devices, impressed upon their legs and arms. But the part on which these ornaments are lavished with the greatest profuion is the breech; this, in both sexes, is covered with a deep black; above which, arches are drawn over one another, as high as the short ribs. These are often a quarter of an inch broad, and the edges are indented. These arches are exhibited, both by the men and the women, with singular distinction. The face in general is left unmarked. Some old men had the greatest part of their bodies covered with large patches of black, deeply indented at the edges, like a rude imitation of flame. It is only at New Zealand, and in the Sandwich islands, that they tattoo the face. There is also this difference between the two half, that, in the former, it is done in elegant spirai volutes, and in the latter, in straight lines, crossing each other at right angles. The bands and arms of the women are very neatly marked, and they have among them a singular custom, the meaning of which could not be learned, that of tattooing the tip of the tongues of the females. This custom of tattooing, it is apprehended, is frequently designed as a sign of mourning on the death of a chief, or any other calamitous event. Persons of the lowest class are often tattooed with a mark, that distinguishes them as the property of the several chiefs to whom they belong.


TATTEUT, anciently TADUTTI, in Geography, a town of Algiers, formerly a considerable city, now almost completely in ruins: some beautiful granite pillars were dug up some years ago, and placed in a mosque at Constantina; 25 miles S. of Constantina.

TATU, in Ancient Geography, an island situated in the Nile, in the vicinity of the town of Meroe. Pthyn.

TATU, in Zoology, the Brazilian name for the armadillo, or shell-hedgehog, or dasypus of Linnaeus. See DASYUS.

Tatu-Aparu, the name of a creature of the armadillo kind, being the three-banded or triclinus dasypus of Linnaeus. See DASYPS.

This animal burrows under ground, keeps its hole in the day, and rambles out at night: when it would sleep, or when it is afraid of being taken up, it contracts its curl into a round figure; and hiding its whole body within, it might sooner be taken for a sea-urchin than a land-animal. It is hunted with little dogs, feeds on potatoes, &c. drinks much, grows very fat, and is reckoned delicious eating when young, but when old, has a musky disagreeable taste; breeds every month, and brings four at a time. Ray and Pennant.

Tatu-Mofcitens, the Wafel-headed Armadillo, the name of a small animal of the armadillo kind. This is the dasypus unicinclus of Linnaeus, and banded armadillo of Pennant: it has a very slender head, small erect ears, the cruff on the shoulders and rump consisting of square pieces; eighteen bands on the sides; five toes on each foot; length from nose to tail about fifteen inches; the tail five and a half. It inhabits South America. Ray, Pennant, and Crew's Muf. Reg. Soc. p. 19.

Tatu-Poba of Brasil, is the fix-banded dasypus of Linnaeus, having the cruff of the head, shoulders, and rump, formed of angular pieces, and between the bands, and also on the neck and belly, a few scattered hairs; the tail thick at the base, tapering to a point, and not so long as the body, and five toes on each foot. It inhabits Brasil and Guiana. Pennant.

Tatu-Porcius, the name of the pig-headed armadillo, or nine-banded dasypus of Linnaeus, with long ears, cruff on the head, shoulders, and rump, marked with hexagonal figures; the nine bands on the sides distinguished by transverse cuneiform marks; breast and belly covered with long hairs; four toes on the fore-feet, and five on the hind; the tail taper, and a little longer than the body; and length of the whole animal three feet. This animal inhabits South America; and one, that was brought into England a few years ago from the Mosquito shore, was fed with raw beef and milk, but refused our grains and fruit. Pennant.

TATUELE, the name of a species of tatu, or armadillo, being the nine-banded dasypus of Linnaeus, though BUFFON and Pennant attribute to it only eight bands; it has upright ears, two inches long; small black eyes; four toes on the fore-feet, and five on the hinder ones; the length from nose to tail about ten inches, the tail nine; it is of an iron colour on the back, and whithit at the sides; its belly is also whitish and naked, except for a few hairs. It inhabits Brasil.
The flesh of this is accounted more delicious than that of any other creature of this kind, though they may all be eaten. Ray and Pennant.

TATULA, in Botany, a name used by Clusius, and some other authors, for the fruticosum, or thorn-apple.

TATZO, in Geography, a town of Hungary; 40 miles E. of Munkacz.

TAU, in our Ancient Customs, signifies a crofs.


TAU, in Entomology, a species of beetle. See SCARABEOUS. — Allo, a species of Phalaena bombyx. — Allò, a species of Mufca.

TAU, or Tav, in Heraldry, an ordinary, in figure of a T, supposed to represent St. Andrew's crofs, or a crofs potence, the top part cut off.

It is thus called from the name of the Greek T, tau.

TAG, in Ichthyology, a species of Gatus; which fee.

TAU, in Ancient Geography, a town of Egypt, and the metropolis of the nome Phthepuscm. Ptol. and Steph. Byz.—Allo, a town of Aia, between Namaris and Augara. Ptol.—Allo, a gulf of the isle of Albian, on the south-eastern coast. This effuary is the birth of Tay.

TAU, in Geography, a town of Egypt; 12 miles S. of Demotar.

TAVACCARÆ, in the Materia Medica, the name by which many authors call the coccus Maldievos, or Maldive nut.

TAUAC, in Geography, a town of Peria, in Farilcan; 39 miles S.E. of Beuler-Rigk.

TAVAI, an island in the Indian sea, near the coast of Siam, about 20 miles long and 3 broad. N. lat. 13°. E. long. 97° 52'.

TAVAI, a town of Aia, in Lower Siam; 148 miles S. of Martaban. N. lat. 14° 10'. E. long. 98° 12'.

TAVAI Point, the extreme point of a tract of land on the coast of Lower Siam. N. lat. 15° 40'. E. long. 98° 98'.

TAVAI or Tony Poenamamoo, the southermost of the two islands into which New Zealand is divided by Cook's strait, which is for the most part mountainous and apparently barren, and in this respect of a less favourable aspect than the other island, or Echinoanumacao; which fee. The straits, which are about four or five leagues broad, were discovered by Capt. Cook at the close of the year 1769. The islands are situated between the latitudes of 34° and 48° S., and between the longitudes of 181° and 194° W. TAVAI-Poenamamoo is said to be 500 miles long from S.W. to N.E., and from 55 to 140 broad. See NEW ZEALAND.

TAVANAGUROY, a town of Hindooftan, in Myfore; 13 miles W. of Colar.

TAVARADO, a town of Portugal, in the province of Beira; 7 miles W.S.W. of Montemor o velho.

TAVARES, a town of Portugal, in the province of Beira; 13 miles E. of Viseu.

TAVASTLAND, a province of Sweden, bounded on the N. by Earl Bothnia, on the E. by Savolax or the government of Koppio, and the Russian government of Viborg, on the S. by Nyland, and on the W. by the government of Abo, or Finland Proper; about 150 miles in length from N. to S., and from 35 to 100 in breadth from E. to W. The country is very fertile, and consists of fine plains, watered by a great number of rivers and lakes, which abound in fish. It is diversified with arable and meadow lands; so that with respect to these natural advantages, it may not only be looked upon as the belt part of Finland, but is indeed scarcely surpassed in those particulars by any province in Sweden. It is likewise flored with cattle, sheep, and all sorts of game. But notwithstanding this country is so fertile, it is far from being well cultivated; and, consequently, the peasants are generally very poor. Sometimes, indeed, the crops are much damaged by keen and unexpected frosty nights. The northern part of Tavastland is more mountainous and woody than the southern. In the morasses and uncultivated sandy plains, a ferrugious earth is dug up, from which the Eifenland or, iron sandy ore, as it is called, is prepared. The inhabitants subsist by agriculture, grazing, and breeding of cattle, and some of them are employed in the fisheries. They also traffic in corn, peas, beans, flax, hemp, dried fish, cattle, leather, tallow, but- ter, lime, the bark of trees, &c.

TAVASTHUS, or KRONEBORG, a town of Sweden, and principal place in the province of Tavastland, built in the year 1650, on a pleasant spot, by count Per Brahe, and endowed with considerable privileges. In 1713, this town was taken by the Ruffians; and in the late war between them and the Swedes, it was laid in ashes. The cattle, which, exclusive of the town, is properly called "Tavasthus," or "Tavastberg," is well fortified, and serves for an arsenal and royal magazine; 80 miles N.N.E. of Abo. N. lat. 61° 1'. E. long. 24° 15'.

TAVAVIS, or THAOUAOURS, a town of Aia, in Grand Bucharia; 15 miles N.E. of Bucharia.

TAUBATE, a town of Brazil; 130 miles W. of Rio Janeiro.

TAUBE, Frederick William Von, LL.D., in Biography, was the son of Dr. Taube, physician to queen Caroline, confort of George II., and born in London in the year 1728. After the queen's death, the father settled at Zelle, where he died in 1742; and in the following year his son was enterred at the university of Gottingen. Here he readily applied to the study of jurisprudence; and before he left the university, being in his 16th year, he published a dissertation "De Differentiis Juris civilis et naturae," intended to prove that the principles of the Roman, Canon, and German law were contrary to the law of nature, and inconsistent with the rights of man. When he quitted the university, in the year 1747, he travelled into foreign countries, and particularly through some parts of Africa and America. On his return he practised the law at Gottingen, but finding, in conquence of some displeasure which he had excited by the freedom with which he centrifuged the tediousness of law-fruits, that he had no prospect of advancement, he removed to Vienna in 1756, where he obtained some preferment in the army. Soon after an engagement in which he was wounded during the seven years' war, he abandoned the Lutheranism, and embraced the tenets of the church of Rome, hoping thus to rise in the Imperial service. Having given proof of his talents and fidelity in an honourable office, which he occupied, and being acquainted with the English language, he was appointed secretary to the Imperial ambassador at the court of London, and repaired thither in October, 1763. Here he married a niece of the celebrated Dean Tucker, with whom he lived in habits of intimacy and friendship. In 1766 he returned to Vienna, and was appointed secretary to the council of trade, which was an office of great fatigue, on account of the journeys which it obliged him to take to distant places. When this college was disolved, in 1776, he retired to Brufelds. Having fulfilled another confidential commissioin with which he was entrusted, he returned from Belgrade to Vienna in 1777, and was ennobled by the emperor, and appointed a member of the government of Lower Austria. His health being
being much impaired, required an attention which it did not
suit his inclination or occupation to give it: his disorder,
which was an inflammation of the lungs, increased, and ter-
mminated his life in June, 1778, in the 50th year of his age.
He was justly honoured for his integrity, his zeal to serve
his friends, and his liberality. His literary labours evince
the extent of his learning and researches. His principal
works are the tracts already mentioned: “Thoughts on the
present State of our Colonies in America, on their Behaviour
to the Mother-Country, and on the true Interest of the Na-
tion in regard of the Colonies,” London, 1766; “Histori-
cal and Political Sketch of the present State of the English
Manufactures, Trade, Navigation, and Colonies, &c.” 1774,
8vo.; “History of the English Trade, &c. from the ear-
liest Periods till the Year 1776, with an authentic Account
of the true Causes of the present War with North Ame-
rica,” 1776, 8vo.; “J. J. Schetzen’s Elements of Geo-
graphy, improved and enlarged,” 1786, 8vo.; “Historical
and Geographical Description of the Kingdom of Scelvania
and Duchy of Syria, &c. in three parts,” 1777, 1778;
“An Account of various New Discoveries, made in 1776
and 1777, in Scelvania, &c. &c.” Leipfic, 1777, 4to. He
contributed also, between the years 1773 and 1778, to Buf-
chinger’s periodical publications. He also communicated to
the Royal Society of London “A Short Account of a par-
ticular Kind of Torpedo found in the River Danube, with
several Experiments on that Fish,” published in the Phil.

TAUPE, in Geography, a river of Wellphalia, which runs
into the Aland, near Seehanfen.

TAUBER, a river of Germany, which rises about eight
miles S. of Rotenburg, in Franconia, and runs into the
Main at Wertheim.

TAUBER Sw, a lake of Bavaria; 6 miles W. of Berch-
tefraden.

TAUCAL, or Tuchel, a town of Prussian Pom-
relia. This town was taken and burned, in the year 1320,
by the Teutonic knights, and afterwards rebuilt; 44 miles
S.S.W. of Danzig.

TAUCHA, a town of Saxony, in the circle of Leipfic.
This town was built in the year 1221, by Albert, arch-
bishop of Magdeburg, afterwards rebuilt, and in the year
1431 destroyed by the Bohemians and Huftrites, when most
of the inhabitants removed to Leipfic; 6 miles N.E. of
Leipfic. N lat. 51° 22’. E. long. 12° 30’.

TAUCHIRLE, in Ancient Geography, a town of Africa,
in Libya, belonging to the territory of Barce, according to
Herodotus, afterwards called Arifnoe. M. D’Anville sug-
poses that it is the present Teukera.

TAVD, in Geography, a river of Ruffia, which rises
in Pelim lake, and runs into the Tobol, 40 miles S. of
Tolbok.

TAUDECONDA, a town of Hindooftan, in Golconda;
25 miles S.W. of Warangole.—Alfo, a town of Hindoo-
ftan, in Dindigul; 7 miles N. of Dindigul.

TAUDENNY, or TUDENNY, a Moorifh and Negro
town or village, on the borders of the Defart in Africa; at
which place are large ponds or beds of salt, which both the
Moors and Negroes purchase, as well as dates and fig-trees
of a large size. The salt-beds are about 5 or 6 feet deep,
and from 20 to 30 yards in circumference. The salt comes
up in red lumps mixed with earth, and part of it is red;
270 miles N.N.W. of Tombuctoo. N lat. 21° 15’. W.
long. 7° 25’.

TAUDOON, a town of Hindooftan, in Lahore; 34
miles S.S.E. of Nagercote.

TAU, a river of France, which runs into the Rhone,
about 6 miles below Loudon.

TAVE, or Taffe, a river of Wales, which runs into the
sea, near Llaugharn.—Alfo, a river, which rifes in two
streams in the southern part of Brecknockshire, and runs
into the Severn below Cardiff.

TAVERA, a town of Corsica, 18 miles N.N.E. of
Ajaccio.

TAVERA di Orta, a town of Naples, in Capitanata; 14
miles S.S.W. of Acfoli.

TAVERNA, a town of Naples, in Calabria Ultra,
formerly the see of a bishop, transferred to Catanzaro; 15
miles N. of Squillace.

TAVERNER, John, in Biography, an eminent mu-
ician, who flourifhed in the early part of the 16th century.
He is often mentioned by Morley among our early contra-
puntists, and by Anthony Wood, as having begun his career
by being organift of Bolton, in Lincolnshire. At the es-
tablifhment of Cardinal college, now Chrift-church, Oxford,
by cardinal Wolfty, he was appointed organift there; but
narrowly escaped martyrdom for hereby, having held fre-
quent conversations with some Lutherans on the abuses of
religion. They were all imprifoned in a deep cave under
the college, ufed for the keeping of falt-fish, of which the
french occafioned the death of fome of them, and fome were
burnt in Smithfield.

Taverner had not gone fuch lengths as many of the fra-
ternity; the fufpicions againft him were founded merely on
his having hidden fome heretical books under the boards of
the school where he taught, for which reafon, and on ac-
count of his professional eminence, the cardinal excufed him,
saying “he was but a musician,” and fo he escaped.

A set of books containing mafles and motets to Latin
words, fome of which were compofed in the time of Hen-
ry VII., and all before the Reformation, is preferved in the
music-school at Oxford. These volumes contain compo-
sitions by John Taverner, Dr. Fayrfax, Avery Burton,
John Marbec, William Kafar, Hugh Afton, John Nor-
man, John Sheppard, and Dr. Tye. The pieces by the
three or four laft are entered in a more modern hand, with
different characters, and paler ink. The chief parts of the
compositions are tranfcribed in a large, dillinct, and fine
hand and character; but bars not having been yet intro-
duced, and being all ad longam, alla breve, or in tempo di Ca-
pella, the figurations, prolations, and moods, render these
books extremely difficult to read, or tranfcribe in score.
However, by dint of meditation and perfeverance, we ar-
 ranged the parts under each other, of several movemens by
all these founders of our church music, particularly John
Taverner, Dr. Fayrfax, and Dr. Tye; having scored an
entire mass by each of them; as they are the most ancient
and eminent of thefe old matter, in whose compositions the
fyle is grave, and harmony, in general, unexceptionable,
if tried by fuch rules as were establihed during their time;
but with refpect to invention, air, and accent, the two firft
are totally deficient.

The compositions, however, of thefe early English mat-
ters, have an appearance of national originality, free from
all imitation of the choral productions of the continent.
Few of the arts of canon, inversion, augmentation, or di-
mination, were as yet practifed by them: short points of
imitation are fometimes discoverable, but they fhow more
the effects of chance than design: and to characterize the
chief of these compofers in the order they have been named;
Tavernder Fayrfax have but little design and melody in
their compositions; and it feems as if they fhould not have
have been ranked, as they are by Morley, with those of a much higher class, at a later period.

We can venture to give a character of Tavernier, from an actual survey of his principal works which have been preserved, and which we have taken the pains to score. This author is in general very fond of flow notes, so that all his pieces which we have seen are ad longam, or, at quickest, alla breve. Long notes in vocal music, unless they are to display a very fine voice, have little meaning, and are wholly destructive of poetry and accent; but our old composers have no scruples of that kind; and being as great enemies to short syllables, as to short notes, exercised the lungs of a finger as frequently upon one as the other.

As the first essays at harmony were made in extemporary discant, upon a plain-fong, so in written counterpoint, it was long a favourite and useful exercise, to build the several parts of a movement upon some favourite chant, making it the ground-work of the composition. And this custom answered several purpofes: it excited ingenuity in the construction of the parts; it regulated and restrained the modulation within the ecclesiastical limits; and as the plain-fong had been long used in the church, by the priests and people, it was still easy for the musical members of the congregation, to join the chorus in singing this simple and essential part, while the choristers and choirmen by profifion, performed the new and more difficult melodies, which had been superadded to it by the composer. The first reformers, or at least their followers, who were perhaps no great musicians, wished to banish every species of art from the church; and either retaining small portions of ancient chants, or making melodies, in the same plain and simple style, for their hymns and psalms, threw aside all figurative harmony and florid counterpoint; and sung in notes of equal duration, and generally in mere unison, those tunes which are still retained by the Calvinists, and in most of the reformed churches of Christendom. At the latter end of the fifteenth, and during the whole of the sixteenth century, as some chant or tune was the foundation upon which the harmony of almost every movement of a mas or motet was built, the additional parts were the superior, medius, counter-tenor, tenor, to which was given the plain-fong in square black notes, of equal lengths to fermibrees in alla breve time, and baffes. The close or final movement of one of these naifes is inserted in Burney's General History of Music, vol. ii. p. 557.

TAVERNES, in Geography, a town of France, and chief place of a canton, in the department of the Var, and district of Brignoles. The place contains 1536, and the canton 4520 inhabitants, on a territory of 280 kilometres, and 9 communes; 3 miles N. of Barjols.

TAVERNIER, JOHN BAPTIST, in Biography, a distinguished traveller, was the son of a native of Antwerp, and born at Paris in the year 1605. The frequent inspection of the maps and charts fold by his father, inspired him with a passion for travelling; so that at the age of twenty-two he had made tours through France, England, the Low Countries, Germany, Switzerland, Poland, Hungary, and Italy. In his busines as a jeweller he was eminently skilful; and he employed 40 years in six journeys in Turkey, Persia, and the East Indies, by all the practicable routes. Having acquired great wealth, on his return from his sixth journey in 1668, he determined as a Protestant to live under a free government; and, with this view, purchased the barony of Aubonne, near the lake of Geneva. But having suffered very considerable loss of property by the misfortun of a nephew, he sold his barony in 1687, and commenced a seventh journey, which terminated his life at Moscow in 1689, at the age of 84. Deditute of talents for writing, he employed Sam. Chappuzeau of Geneva to arrange his memoirs, which is said to have been no easy task. The fruit of this labour was given to the public in two volumes, describing his six journeys, in 1679; and another was added in 1681, by La Chapelle, containing an account of Japan and Tonquin, with a history of the colony of the Dutch in the East Indies. These memoirs of Tavernier, notwithstanding reflections on his veracity, and charges of plagiarism, have been often cited as authority by later writers. Gibbon represents him as "the jeweller who knew so much and so well." Bayle. Moreri. Gen. Biog.

TAVERNIER KEY, in Geography, a small island on the north coast of Cuba, near Tortuga.

TAVERNY, a town of France, in the department of the Seine and Oise; 6 miles E. of Pontoise.

TAVETCH, a community which, with that of Diment, forms one of the high jurisdictions of the Grey League in Switzerland. These two communities occupy the western extremity of the valley of Sopra Selva, stretching as far as the confines of Uri. Tavetch is a pleasant valley, lying at the foot of the Alps, which separate the Gripons from the canton of Uri. The villages are numerous, confining of scattered cottages chiefly constructed of wood. This valley produces pasture, hemp, and flax, and a small quantity of rye and barley. The trees are chiefly firs and pines, and their number gradually diminishes towards the extremity of the vale.

TAVETSCH, a town of the country of the Gripons; 13 miles from Illantz, the capital.—Alfo, a mountain of the same country; 5 miles S.W. of Illantz.

TAUFFERS, a town of the country of Tyrol; 6 miles S.S.W. of Glurentz.

TAUGHT, or Taut, Tigh, in the Sea Language, denotes the flate of being extended or stretched out. Thus they lay, set taught the shrouds, the stays, or any other ropes, when they are too slack and loose.

TAVI, in Geography, a town of Sicily, in the valley of Noto; 7 miles N.E. of Cassa Giovanni.

TAVIANO, a town of Naples, in the province of Otranto; 11 miles W.N.W. of Alefano.

TAUJEPOUR, a town of Bengal; 60 miles S.S.W. of Calcutta. N. lat. 21° 52'. E. long. 87° 45'. Alfo, a town of Bengal; 32 miles E. of Purneah. N. lat. 25° 48'. E. long. 85° 11'; Alfo, a town of Hindooistan, in Bahar; 15 miles N. of Chuprah. N. lat. 26° 2'. E. long. 84° 50'; TAVIGNANO, a river of Corsica, which runs into the sea, 15 miles S. of Cervione.

TAUILLA, a town of Arabia, in the province of Yemen; 24 miles W. of Tuna.

TAUILE, a town of Egypt, on the Nile; 2 miles N. of Mafona.

TAVIRA, or Tavila, a sea-port town of Portugal, in the province of Algarve, surrounded with walls, and defended by a castle; the harbour is protected by two forts. It contains two churches, an hospitall; five convents, and about 5000 inhabitants; 111 miles S.S.E. of Lisbon. N. lat. 37° 41'. W. long. 7° 35'.

TAVISTOCK, an ancient borough and market-town, in a hundred of the same name, in the county of Devon, England, is situated on the banks of the river Tavy, 34 miles W.S.W. from Exeter, and 206 miles in the same bearing from London. Its origin and growth seem to have arisen from the foundation and establishment of a magnificent abbey in the tenth century, by Ordgar, earl of Devon, and his
TAU

his son Ordulphe. Within thirty years after its foundation, this abbey was burnt by the Danes, but was soon afterwards rebuilt, and became more flourishing than before. By a charter granted by Henry I., it appears that he bestowed the jurisdiction, and the whole hundred of Tavistock, upon the abbey, together with the privilege of a weekly market, and a three-days' fair. This charter is recited and confirmed by one granted 21 Edw. III. The riches of the abbey progressively increased; and Richard Barham, the thirty-fifth abbot, obtained from Henry VIII. the privilege of sitting in the house of peers, or, in other words, was mitred. His patent was dated January 23d, 1513; but the honour continued only till the year 1530, when John Peryn, the thirty-sixth abbot, surrendered the abbey to the crown, and had a pension of 100l. per annum. The poolesters of the abbey, with the borough and town of Tavistock, were given by the king to John, lord Ruffell, whose descendant, the present duke of Bedford, is now proprietor. Various fragments of the abbey still remain, but are, for the most part, incorporated with other buildings. The abbey church is described by Leland as 126 yards in length; the cloisters as extensive; and the chapter-house as a most magnificent structure; but all these have long since been completely demolished. Several buildings, that seem to have belonged to the abbey, are now used for warehouses; and adjoining to the principal inn is a large, handsome, arched gateway, ornamented with lofty pinnacles, apparently of the time of Henry VI. The town of Tavistock is large and populous; but the streets are narrow, and indifferently paved; and many of the houses have an appearance of age. The river is here crossed by two bridges, and after storms of rain, by flowing over various ledges and masses of rock, presents a very tumultuous spectacle. The church is a spacious edifice, confining of four aisles, a chancel, and a tower at the west end, railed on arches. Within the church are preserved some human bones of a gigantic size, which were found in a stone coffin, dug out of the ruins of the abbey, and are said by tradition to be those of Ordulphe, whom William of Malmesbury represents of such immense stature, that he could stride over rivers ten feet wide! Tavistock is a borough by prescription, and has sent two members to parliament from the 23d year of Edward I. The right of election is in the freeholders resident in the borough. The town is one of the fannaries of Devonshire, but does not now appear to have been incorporated. It is governed by a portreeve, who is elected annually at the court of the lord of the manor. The population of the parish, according to the return of the year 1831, amounted to 4723; the number of houses to 514. Many of the inhabitants are employed in the manufacture of ferges for the East India Company. Five fairs are held annually, and a weekly market on Saturdays. An institution for the study of Saxon literature existed in Tavistock at a very early period, and lectures were read in that language in a building purposely appropriated, and called the Saxon school. These lectures were discontinued about the time of the reformation. Several of the abbots were learned men; and the encouragement they gave to literature is evident, by the establishment of a printing-pref in the abbey within a few years of the time when the art was brought into England. Among the books that issued from this press was Walton's translation of "Boethius de Confolatione," "emprented in the exempt Monastery of Tavistoke in Denhyre, by me Dan Thomas Rychard, monke of the said Monastery," 1525, 4to.; and the "Confirmation of the Tynners Charter," 26th of Henry VIII., 16 leaves, 4to. Bishop Gibson also mentions a Saxon Grammar as having been printed here about the commence-

TAU

ment of the civil wars; but this assertion is supported by other antiquaries to be unfounded.

Among the more eminent natives of Tavistock was Francis Drake, one of the most distinguished mariners that Britain ever produced, and the first Englishman that circumnavigated the globe.

Morwell-houfe, about three miles from Tavistock, was the hunting-seat of the abbots of Tavistock; and from its situation near Morwell-down, and the woods on the banks of the Tamar, was well adapted for this purpose. Its form is quadrangular, with a large arched gateway in front, ornamented in a similar manner to that of the abbey. The vaulted ceiling of this entrance has several coats of arms sculptured in moss-itone. At a little distance is Morwell-rock, which rises almost perpendicularly to an immense height from the bed of the Tamar.

About four miles north of Tavistock is Brum-Tor, a vast mass of craggy rock, which floats up from the road between Tavistock and Lydford, and becomes a very conspicuous sea-mark to mariners in the British Channel, though more than 20 miles distant. The summit is frequently enveloped in clouds, but in fair weather commands an extensive prospect, and the ships in Plymouth harbour may be distinctly seen from its summit. Near the top is the parish church of the little village of Brent, which, like most of the churches in similar situations, is dedicated to St. Michael. On Dartmoor, about three miles east of Tavistock, are several masses of rock, and also the remains of Druidical circles and avenues.—Beauty of England and Wales, vol. iv. Devonshire, by J. Britton and E. W. Brayley.

TAVIUM, or TAVIA, in Ancient Geography, a town of Asia, in Galatia, and capital of the Trocmi, according to Ptolemy, Strabo, and Phiny.

TAULACUM, in Natural History, a name given by the people of the East Indies to a species of orpinment, which is very common with them.

It is of a dirty yellow colour, and is composed partly of an irregular mass, partly of fine flakes, like scales of fishes. These are of the best colour. The whole mass, on being exposed to the fire, burns, and emits copious fumes; but it does not melt readily. After it has been several times calcined, the Indians give it internally in intermittent fevers, with safety and success. Wood. Catal. Foss. vol. i. p. 24.

TAULE, in Geography, a town of France, in the department of the Finifterre; 3 miles N.W. of Morlaix.

TAULE, a town of Hindoostan, in Myvore; 47 miles E. of Seringapatam.

TAULIGNAN, a town of France, in the department of the Drôme; 12 miles S.E. of Montelimart.

TAUMACO, a town of Greece, in the province of Thessaly; 18 miles N.W. of Zeiton.

TAUMACO, an island in the Pacific ocean, discovered by Quiros, in 1606; about 24 or 25 miles in circumference. The island abounded with bananas, cocoa-trees, and palms: it produces also sugar-canes, and many kinds of nutritious roots. The fleet here obtained, without difficulty, refreshments, water, and wood, of which it stood in great need. The Spaniards lived on good terms with the natives, who were eager to procure them all the assistance that their island afforded; nor was peace infringed till the very moment of their departure. Thinking that it would be of service in the remainder of their voyage, to have some Indians on board, who might act as guides or interpreters, the Spaniards seized four whom they carried on board by force. Their chief was soon informed of it, and came to demand them in the most earnest manner; but they were refused,
and war was instantly declared. A fleet of canoes came out
to attack the Spanish ships, which their fire-arms quickly
dispersed, and would totally have destroyed, had not these
brave islanders, with all their courage, been incapable of their
inferiority. S. lat. 10°. E. long. 169° 25'.
TAUME, a river of England, which rises in the county
of York, and runs into the Mersey, in Lancashire, opposite
Stockport.
TAUNA, a town of Egypt, on the Bahir Joseph, or
Canal of Joseph, which forms a communication between the
Nile and the Birket el Kerun; 5 miles S.W. of Almu-
nein.
TAUNDA, a town of Hindoostan, in Oude; 50 miles
S.E. of Fyzabad. N. lat. 26° 32'. E. long. 82° 53'.
TAUNNA, a town of Hindoostan, in Oude; 30 miles
W. of Lucknow.
TAUNT, a sea-term, signifying high or tall. When
the masts of a ship are too tall for her, the is
taunt-masted.
TAUNTON, in Geography, a considerable market-town
and borough, in the hundred of Taunton-Dean, county of
Somerset, England, is situated on the high road between
Bath and Exeter, 52 miles S.W. from the former city,
32 miles N.E. from the latter, and 144 W. by S. from
London. It was anciently called Thonodunum, or the
Town of the Tone, by which river it is watered. Taunton
is unquestionably a place of remote antiquity : from the
discovery of coins and other relics, there is reason to suppoze
it was not unknown to the Romans; but it is certain it was
of great note in the time of the Saxons. For ina, a West
Saxon monarch, built a castle here for his residence in the
year 700, which was destroyed in 722 by his queen Ethel-
burga, who prevailed on him to reign the crown, and retire
to a monastery. A new castle, on the site of the former,
was erected by William Giffard, bishop of Winchester in the
time of Henry I. By various documents of the bishops of
that see, dated Taunton castle, it seems to have been a place
of their frequent residence. In 1495 the whole building
was repaired, and an embattled gateway built by bishop
Thomas Langton. Though the building has been much
modernized, this gateway still remains. Considerable im-
provements were made in 1577, by bishop Robert Horn,
who likewise built the great hall as it now stands, in which
the alizes, county felions, and bishop's courts are held: it
is 119 feet in length, 30 in width, and 20 in height. The
other apartments are applied to various public ules. The
whole castle occupied a front of 195 feet, with a circular
tower at each end, of which only one is now remaining.
Taunton had a distinguished share in the various civil com-
motions of this kingdom: in the contests of the Sax-
kings; in the civil wars between the houses of York and
Lancaster; and in the insurrection in favour of Perkin
Warbeck, in Henry VII.'s reign. In the civil wars of
Charles I., it became an object of vigorous struggle between
the royal and parliamentary forces which should possess its
fortress, it being considered as the key to the west of Eng-
land. It was also deeply involved in the rebellion of the
duke of Monmouth, who here assumed the title of king,
and was publicly proclaimed.
The town of Taunton, in point of size, buildings, and
respectability of inhabitants, may vie with most cities. It
contains two parishes, extends nearly a mile from east to
west, and confines of four principal streets, which are well
built, and of commodious width. Though ancient and
populous, it was not incorporated till the reign of Charles I.,
1627. It did not long enjoy this privilege; for Charles II.,
on his restoration, out of regardment for the town's adherence
to the parliament against his father, deprived it of its chart
It continued disenfranchised 17 years, when the king granted
it a new charter. The corporation consists of a mayor, re-
corder, a justice of the peace, two aldermen, ten capital,
and ten inferior burgesses. The justice is always the late
mayor, who, with the two aldermen, are annually elected
out of the capital burgesses; and the vacancies occasioned
by this election are filled up from the inferior members of
the corporation. The officers are a town-clerk, two fer-
jants at mace, a bell-man, and a beadle. 'There are acting
under the mayor, and sworn in by him, two constables and
fix ftying-men or petty constables, who, with two port-
cives and two bailiffs, are annually chosen by a jury, and
are, properly speaking, the officers of the bishop of Win-
chster, in whose court they are elected. The mayor's
officers cannot arrest within the borough; and there being
no prison, except a kind of town-bridewell called the Nook,
deptors are sent to the county gaol at Ilchester. Though
the town has for ages been flourishing, and of great impor-
tance in the county, yet the corporation has neither land,
houses, nor joint Rock in money; their charter excluding
them from such possessions.
Taunton is an ancient borough by prescription, and has
returned two members to parliament from the year 1294,
23 Edward I. The right of election is vested in a descrip-
tion of people called pot-walers, or pot-walbrers. There
are all such inhabitants as reside within the borough, and
boil their own pots, provided they are not puffers, and
have not received relief from the fund of any charity within
a year. The number of voters is estimated at about 500.
The bounds of the borough, to which the right of election is
limited, are small in proportion to the town, compre-
hending only a part of the parish of St. Mary Magdalene.
The principal article of trade in Taunton is the woollen
manufacture, which has flourished to a great extent almost
ever since its introduction into England by the famous John
Kempe, the first manufactory being established so early as
the year 1356. Upwards of one thousand looms are said to
have been employed at one time; but the trade is now
greatly reduced, and the population decreased: houses in
the suburbs have fallen to ruin, and have been destroyed. A
large silk manufactory was established in the year 1780.
Two large markets are held on Wednesday and Saturday,
and there are two annual fairs. By the population report
of the year 1811, Taunton was stated to contain 1371 houses,
and 6907 inhabitants.
The edifices for religious worship in this town are two
parish churches, and five dissenting meeting-houses. The
church of St. Mary Magdalene is a spacious beautiful struc-
ture, with a lofty and strong tower of excellent workman-
ship, of the florid style, having four lofty pinnacles thirty-
two feet high, making the whole height 153 feet. This tower
has thirteen handome windows, with a variety of curious
prominent ornaments, that give the whole an air of magnifi-
cence, united to a delicate elegance, not to be equalled in
the county, nor perhaps in the kingdom. It was probably
erected by Henry VII., who, when he came to the crown,
rebuilt many of the churches in Somersetshire, as a reward
of the attachment of the county to the Lancastrian party. The
inside of the church is anwhterable to the exterior, and makes
a grand appearance. Its curious roof is supported by twenty-
four pillars, in four rows, dividing it into five aisles and a
chancel. There are forty-four windows, some of which have
painted glafs. The other church, St. James's, though
very way inferior to the former, is a strong, plain, ancient
structure, suppozed to have been built in the 13th cen-
tury. The meeting-houses are St. Paul's, and the new meet-
ing
Of Matthew Toulmin's Geography, partly in 1794, 29 miles S. of Bolton. N. lat. 41° 48'. W. long. 71° 2'. — Alto, a town of America, in the province of Maine, which runs into the sea near New Britol.

TAUNTON-DEAN, a valley of England, extending about thirty miles in length, in the county of Somerset, of fertility and produce equal to almost any in the kingdom. It takes its name from Taunton, the principal town.

TAVOLADOTO, a small island near the coast of Sardinia. N. lat. 40° 54'. E. long. 9° 54'.

TAVOLARA, a small island near the coast of Sardinia. N. lat. 40° 54'. E. long. 10° 54'.

TAVORA, a river of Portugal, which runs into the Duero, 5 miles N.E. of Lamego. — Alto, a town of Portugal, in the province of Beira; 6 miles E. of Lamego.

TAVOVOVEL, a small island near the coast of Lewis. N. lat. 58° 6'. W. long. 6° 29'.

TAURAGUR, a town of Hindoostan, in Lahore; 24 miles W.N.W. of Nogoracot.

TAURAS!, a town of Naples, in Principato Ultra; 12 miles S.E. of Benevento.

TAURASIA, in Ancient Geography, a town of Italy, in Gallia Transpadana.

TAURAT, in Geography, a town of the island of Cuba; 38 miles N.N.E. of St. Jago.

TAUREA, among the Romans, a punishment inflicted by whipping with scourges made of bulls' hides.

TAUREAU, in Geography, an island on the French coast, with a fort to defend the harbour of Morlaix.

TAUREE, a town of Bengal; 35 miles S.S.E. of Ghydore.

TAURESIUM, in Ancient Geography, a town of European Dardania, on the other side of the territory of Duras; the birth-place of Justinian, who founded here a magnificent town, called after his own name.

TAURI, liber liber. — In some ancient charters, taurs liber signifies a common bull kept for all tenants within such a manor, or liberty. — "Cunn liberitate faddie, liber taui, et liberi apri, &c." See Free Bull.

TAURIS, in Ancient Geography, a people of Sarmatia, in the vicinity of Scythia. According to Herodotus, these people had a custom of sacrificing to Iphigenia, the daughter of Agamemnon, the strangers whom chance threw on their coasts, and also the Greeks who fell into their hands.


TAURIS, in Ancient Geography, an island of the Mediterranean sea, between New Carthage and Caxare of Matritania. Anton. Itin.

TAURIANA, a town of Italy, in Brutium.

TAURICA CHERSIANUS. See CHERSIONUS TAURUS and CRIMEA.

TAURIDA, TAURICHESSA, or province of Taursis, in Geography, a province of Russia, being part of the government of Catherinemof or Ectorinemof or Ekaterinof, bounded on the N. by the rivers Dnieper and the Konfki, on the W. and S. by the Black sea, and on the E. by the sea of Azof. This fertile peninsula, which was the great mart of commerce in the Black sea, was colonized for the purposes of trade by the Greeks, Romans, Genoese, occupied by the Turks under Mahomet II., and governed by the khans of the Tartars, a vassal to the Porte. On the peace of Kainari, in 1774, it was declared an independent sovereignty, taken possession of by Catharine II. on the abdication of the Khan Salim Geral, in 1783, and confirmed to Russia by the Porte in the same year by the treaty of Constantinople. The empress revived several of the ancient Greek names. M. Pallis has exhibited an animated and delightful picture of this province in his account of a journey made in 1794, for which we refer to Tooke's Russia, vol. i. For a farther account of it, see CRIMEA. See also RUSSIA.

TAURIDA, Mountains of, are extended and lofty, forming the southern side of the province, and the shore of the Euxine sea. The range extends from Theodofia in a straight line westwards, quite up to Balbek. At Karasofiar two towering pinnacles shoot up, and at Akmelchait a very elevated one, called Aktau. The smaller mountains and distinct and scattered. It is very probable that this range is partly a continuation of the Caucasus, and partly of the Carpathian mountains; and that these two principal chains are connected by it: which also seems apparent from the nature and qualities of the mountains opposite to those of Taurida, which extend beyond the Danube, through Bulgaria, and are called Pulkhanian. The greater part of these mountains of Taurida consists of chalk-masses with petrifactions, and many beds of sand and marle, and chalk-hills with flints. Hence it is presumed that they are not to be classed with the original, but only with the alluvial or deposited mountains. A part of them is thought to owe its origin even to the subterranean fires. Whether this be the case or not, it is said that lead, copper, and iron ores are found in them, as well as jasper, agate, and mountain crystal. They are very rich in lime-flint, marbles, flates, sand-flint, coal, naphtha, and common salt. The site of Taman consists merely of beds of sand and marle, without lime-stone. The height of the Taurida mountains is moderate; they are in a great degree defitute of forests. The trees that grow upon them are those of the rich foliage, such as oak, beech, chestnut, &c. But what they want in wood is made up very amply by the rich and beautiful herbs of the valley. The rivers that take their rise from these mountains are the Alma, Kattha, Kabarda, Salgir, Karailu, and many lesser streams, that form pleasing natural cascades.

U 2
TAURILIA, among the Romans, games in honour of the infernal gods. They were otherwise called ludi tauri.

TAURINIA, in Ancient Geography, a town of European Sarmatia, in the peninsula called "Curfus Achilles." 
Steph. Byz.

TAURIS, in Geography. See Tabrez.

TAURISCI, in Ancient Geography, a Celtic people, who were established along the Danube. They were separated from the Scordisci by a mountain called by Pliny Mons Claudius.

TAURO, a town of European Sarmatia, in the peninsula of "Curfus Achilles." Suidas.

TAUROBOLIUM, orTaurobolion, among the Ancients, sacrifices of bulls, which were offered to Cybele, the mother of the gods, to render thanks to the gods of the earth, for her teaching men the art to tame those animals, and fit them for labour.

The Taurobolium was a kind of sacrifice of expiation and purification; of which no trace occurs before the reign of Antonine, and which seems to have terminated under Honarius and Theodosius the younger. It was principally employed in the consecration of the priests of Cybele.

TAURO-CASTURO, in Geography, a town of Greece, in Livadia; 20 miles N.N.E. of Athens.

TAUROCINNIA, in Ancient Geography, a river of Italy, in Magna Graecia; and the people who lived upon its banks in the vicinity of the town of Rhegium, were called Taurocini.

TAUROCOLLA, Bull-Glue, a sort of glue much used among the ancients in works that required strength, being accounted far stronger than any other kind. It was made by boiling down the ears and genital parts of a bull in water.

TAUROENTUM, in Ancient Geography, a colony founded by the ancient Marcellus on the sea-shore, to the right of the entrance into the bay of Ciotat.

TAUROGEN, in Geography, a town of Samogitia; 30 miles S.W. of Rofienne.

TAUROMENIUM, in Ancient Geography, a town of Sicily. See Taormina.


TAUROPOLIAN, in Ancient Geography, the name of a temple situated in the isle of Samos; dedicated to Artemis, or Diana. 
—Alfo, a temple dedicated to Diana, in the name of Caria. Strabo.

TAUROPOLIS, a town of Asia Minor, in Caria.

Taurus, in Astronomy, the Bull, one of the twelve signs of the zodiac, and the second in order.

The stars in the constellation Taurus, in Ptolemy's catalogue are 44; in Tycho's catalogue, 43; in Hevelius's catalogue, 51; in the British catalogue, 141. See Constellation.

Taurus, in Ancient Geography, a name given by the ancients to a chain of mountains, which commenced in Asia Minor, occupied the northern part of Clisia, and proceeded to join, towards the north of Syria, mount Amanus; but afterwards the name has comprehended the mountains which reach from the Taurus of the ancients to the coast of the Caspian Sea. 
—Alfo, the name of a promontory on the eastern coast of Sicily. Ptolemy. 
—Alfo, a mountain of Scythia. It is a branch of mount Taurus that extends to the environs of the Palaus Aretica and of the Caspian Sea. Jornandes. 
—Alfo, a mountain of Germany, and a mountain of Ethiopia. 
—Alfo, a place of Palestine, at the entrance of the town of Jericho. 
—Alfo, a river of Greece, in the Peloponnesus. 
—Alfo, a river of Asia, in the vicinity of Pamphylia. —Alfo, the name of one of the three canals by which the town of Alexandria, in Egypt, communicates with the sea. —Alfo, a place of Sicily, 60 stadia from the town of Syracuse. —Alfo, a marsh of Gallia Romanus.

Taurus, in Geography, was a general name given by the ancients to any thing of a gigantic nature, and hence it has been applied to a celebrated range of mountains, which is said to extend from the Grecian Archipelago to the extremities of Asia. By Strabo it is thought to originate in Caria and Pamphylia; and by some modern geographers, on the coast of Cilicia, not far from Scanderon. However this be, it interjects Asia Minor from E. to W., and advancing in a N.E. direction, intercepts the course of the Euphrates, and spreads itself over the kingdom of Armenia, where it unites with mount Caucasus. It then detaches a variety of branches into Persia, of which the most conspicuous is that named Mount Zagros by the ancients. This long and lofty range formerly divided Media from Assyria, and now forms the boundary of the Persian and Turkish empires. It runs parallel with the river Tigris and Persian gulf, and almost disappearing in the vicinity of Gombran, seems once more to rise in the northern districts of Kerman, and following an easterly course through the centre of Meckraun and Balouchistan, is entirely lost in the deserts of Sinde.

Taurus, in some Ancient Customs, signifies a husband.

Leg. H. I. cap. 7. "Videtur autem matris ejus, cujusque taurus allusit." 

Taurus, in Entomology, a species of Scarabaeus. —Alfo, a species of Cicada, found in Coromandel. —Alfo, a species of Cixus.

Taurus, in Ornithology, a name given by the ancients to the bittern or butter-bump, from its imitating the roaring of a bull in its noise.

Taurus, in Zoology. See Bos and Bull.

Taurus, in Ethiopia, the Ethiopian Bull, an animal described in a very remarkable manner by Pliny; but contrary to the course of nature, that we may very justly rank it among the other extraordinary animals, such as the man-tickora and the vermis caroelus, of sixty or seventy feet in length.

TUSA, in Geography, a town of Saxony, in the circle of Neustadt; 2 miles N. of Ziegenbruck.

Tauschelin, a town of Bohemia, in the circle of Schlan; 10 miles W.N.W. of Schlan.

Tauschin, a town of Bohemia, in the circle of Kauzim; 7 miles S.E. of Kostelec.

Tausen, John, in Biography, called the "Danish Luther," because he was one of the first promoters of the reformation in Denmark, was born of parents who were peafants in the isle of Fyen, in the year 1495. Having finished his course of education, he became a monk in the convent of the order of St. John of Jerusalem, in Antofohow, and here he ingratiated himself so much with the prior, that he obtained a pension for travelling into foreign countries, on condition that he should visit Wittenberg, which was at that time the focus of heresy. In his progress he visited Louvain and Cologne, where he had an opportunity of perusing some of the works of Luther, with which he was so captivated, that he could not resist the inclination of proceeding to Wittenberg, notwithstanding the prior's interdict. In this place he pursued his studies under the instruction of Melanchthon with such success, that he was appointed to give public lectures on theology in the University of Copenhagen. In his consent, to which he was soon recalled, he frequently preached; and at length, viz. in 1524, publicly avowed himself a disciple of Luther. The confluence
quence was his expulsion from the convent at Antoerskow, and his retirement to another at Wiborg. As he here propagated his doctrine, he was imprisoned by the prior; but by this act of severity he was emboldened to proceed, and preached to the populace from a window. Being liberated in 1526, he was in the same year appointed chaplain to the king, and permitted to preach openly at Wiborg. He soon acquired a number of followers, who went to church armed, in order to protect him from the violence of the Papists. In 1529 he was invited to officiate in the church of St. Nicho-
las, at Copenhagen; and in the following year he attended, as director, at a conference which took place in that city between the Lutherans and the Roman Catholics. On the death of Frederic I., he was banished from Zealand, but being after a few days invited to return, he was appointed clergyman and lecturer in theology at Roichkild. In 1542 he was advanced to the episcopal chair of Ribe, and died in the year 1561. Taufi, besides an improved Danish translation of the Psalms, printed in 1544, and at Copenhagen in 1557, was the author of several works, consisting of Danish hymns, and treatises on the doctrine of Luther. A full account of his meritorious services may be found in Professor Munter's History of the Reformation in Denmark, &c.

TAUSS, or Domaizlitz, in Geography, a town of Bohemia, in the circle of Pilzen; 26 miles S.S.W. of Pilzen. N. lat. 49° 25'. E. long. 12° 52'.

TAUSTE, a town of Spain, in Aragon; 25 miles N.W. of Saragossa.

TAUTENBURG, a town and citadel of Saxony, in Thuringia; 3 miles S. of Cambur.

TAUTICA, in Ancient Geography, a town of Aisia, in Media.

TAUTOLOGICAL Echoes, are such echoes as repeat the same sound or syllable many times. See Echon.

TAUTOLOGY, in Grammar, a needless repetition of the same sense in different words; or, a representation of any thing as the cause, condition, or consequence of itself. Of the first kind is that of Virgil:

"——Si fata virum servant, & fecitur aura
Ætherea, neque adhaerere crudelibus occupat umbra."

Such also is this of Addison:

"The dawn is overcast;—the morning hours;
And heavily in clouds brings on the day." —Cato.

Here the same thought is repeated thrice in different words.

It is also considered as of the nature of tautology, to lengthen a sentence by coupling words altogether or nearly synonymous, whether they be substantives or adjectives, verbs or adverbs. This is a very common fault, and to be found even in our best writers. It should ever be remembered, as an invariable maxim, that words which add nothing to the sense or to the clearness, must diminish the force of the expression. There are two occasions, however, on which synonymous words may be properly used. One is, when an obscure term, which we cannot avoid employing, on account of some connection with what either precedes or follows, needs to be explained by one that is clearer; the other is, when the language of thepassions is exhibited. Passion dwells on its object; the impassioned speaker always attempts to rise in expression; but when that is impracticable, he recurs to repetition and synonymy, and thus produces in a degree the same effect. An adjective and its substantive will sometimes include a tautology. Moreover, in some single words, there is so much the appearance of tauto-

logy, that they ought, in prose at least, to be avoided; such are worse for worse, lessfor less, chiefest for chief, extreme for extreme; Molt Highest, as in the liturgy, for Most High. Campbell's Philosophy of Rhetoric, vol. ii.

TAUVE, in Geography, a town of France, in the department of the Puy de Dome; 15 miles W. of Besse.

TAUVO, a small island on the E. side of the gulf of Bothnia. N. lat. 64° 50'. E. long. 24° 31'.

TAVY, a river of England, which rises in Devonshire, passes by Tavistock, &c. and joins the Tamar, two miles below Saltash.

TAUZIM. See Teusing.

TAW, a river of England, which rises about three miles S.E. from Oakhampton, and runs into the Bristol channel below Appledore, forming a large bay at its mouth, called Barnstable bay.

TAW, a town of Prussia; 23 miles W.S.W. of Tilsit.

TAWALLY, one of the Molucca islands, 25 miles long from north to south, and from 5 to 9 broad. S. lat. 0° 21'. E. long. 127° 14'.

TAWANDEE CREEK, a river of Pennsylvania, which runs into the E. branch of the Susquehanna, N. lat. 41° 45'. W. long. 76° 30'.

TAWARRAN, a town on the N.W. coast of the island of Borneo. N. lat. 6° 0'. E. long. 116° 15'.

TAWAS, Indians in the Ohio, on the river Miami of the Lake.

TAWEE-TAWEE, an island in the Sooloo Archipelago, 30 miles long, and from 3 to 10 broad. N. lat. 5° 15'. E. long. 120°.

TAWING, Skinning, the art or manner of preparing or dressing skins in white, to fit them for use in divers manufactures, particularly for gloves, &c.

All kinds of skins may be tawed; but it is chiefly those of sleek, lambs, kids, and goats, that are used to be dressed this way, as being those fittest for gloves.

Method of tawing or dressing Skins in White.—The wool or hair being well got off the skins by means of lime, &c. (as described under the article Shamy), they are laid in a large vat of wood or stone, set in the ground, full of water, in which quick-lime has been flaked; in this they continue a month or six weeks, as the weather is more or less hot, or as the skins are required to be more or less soft and pliant.

While in the vat, the water and lime are changed twice, and they are taken out and put in again every day. When taken out for the last time, they are laid all night to soak in a running water, to get out the greatest part of the lime; and in the morning they are laid fix together on the wooden leg, to get off the flesh by scraping them slowly, one after another, on the flesh-side with a cutting two-handled instrument, called a knife; and while this is in hand, they cut off the legs, and other superfluous parts about the extremes.

This done, they are laid in a vat or pit with a little water; where, being well filled with wooden poles for a quarter of an hour, the vat is filled up with water, and the skins are rimed in it. They are next thrown on a clean pavement to drain; which done, they are cast into a fresh pit of water, where being well rimed they are taken out, and laid on the wooden leg fix at once, with the hair-side outermost, over which they rub a kind of wheathone very briskly, to soften and fit them to receive four or five more preparations given them on the leg, both on the flesh-side and the hair-side, with the knife, after the manner above-mentioned.

They are then put into a pit with water and wheat-bran, and stirred about in it with wooden poles, till the bran is perceived
perceived to flick to them, and then are left. After this, as they rise of themselves to the top of the water by a kind of fermentation, they are plunged down again to the bottom, and, at the same time, fire is set to the liquor, which takes as easily as if it were brandy, but goes out the moment the skins are all covered.

This operation is repeated as often as the skins rise above water; and when they rise no more, they are taken out, laid on the wooden ledge, the flesh-side outward, and the knife is passed over it to scrape off the bran. The bran thus cleared, the skins are laid in a large barrel, where they are loaded with huge flomes to promote their draining; and when sufficiently drained their feeding is given them, which is performed after the following manner: For 100 large sheep-skins, and for smaller in proportion, they take eight pounds of alum and three of sea-falt, melt the whole with water in a vessel over the fire, pouring the solution out, while yet lukewarm, into a kind of trough, in which are 20 pounds of the finest wheat-flour, with eight dozen yolks of eggs; of all this together is formed a kind of paste, a little thicker than children's pap, which, when done, is put into another vessel, to be used in manner following.

A quantity of hot water being poured into the trough in which the paste was prepared, two spoonsfuls of the paste are mixed with it; in order to which they use a wooden spoon, which contains just what is required for a dozen skins; and when the whole is well diluted, two dozen of the skins are plunged into it, care being taken by the way, that the water be not too hot, which would spoil both the paste and hurt the skins. Having laid some time in the trough, they are taken out one after another with the hand, and stretched out; this is repeated twice; when they have all had their paste, they are put into tubs, where they are pulled after with wooden pellies.

Then they are put into a vat, where they remain five or six days or more, and are at last taken out in fair weather, and hung out to dry on cords or racks; the quicker they dry the better; for if they be too long in drying, the salt and alum within them are apt to make them rise in a grain, which is an essential fault in this kind of dressing.

When the skins are dry, they are put up into bundles, and just dipped in fair water; from which being taken out and drained, they are thrown into an empty tub, and, after some time, are taken out, and well trampled under foot.

They are then drawn over a flat iron instrument, the top of which is round, like a battledore, and the bottom fixed into a wooden block, to stretch and open them: when opened, they are hung in the air upon cords to dry; and when dry they are opened a second time, repapping them over the fame instrument.

Lastly, they are laid on a table, pulled out and laid smooth, and are thus in a condition for sale and use.

After the same manner are dressed hores's, cows', calves', skins, &c. for the faddlers, harnets-makers, &c., as also dogs', wolves', bears' skins, &c. excepting that in these the use of paife is omitted, salt and alum-water being sufficient. See Tanning.

By flat. 9 Ann. c. 11. and 10 Ann. c. 26. the following duties are imposed on hides or skins tawed or dressed in Great Britain. For hores-hides dressed in alun and falt, or meal, or otherwise tawed, 6d. a hide; hides of fleers, cows, and all other (except hores-hides) dressed in alun and falt or meal, or otherwise tawed, 3s. a hide; calve-skins and kips, dressed in alun and falt or meal, or otherwise tawed, 15s. a pound; ikins fo dressed or tawed with the hair on, 3s. a dozen, and without hair, 12. a dozen; dog-skins fo dreffed or tawed, 12. a dozen; buck and doe-skins (except what paid the duty on importation) dressed in alun and falt or meal, or otherwise tawed, 6d. a pound; kid-skins fo dressed or tawed, except as before, 12. a dozen; goat-skins fo dressed or tawed, 2s. a dozen; beaver-skins fo tawed, 2s. a dozen; sheep-skins and lamb-skins fo dressed or tawed, 1s. 6d. a pound; and all other tawed skins, not before charged, 50s. for every 100l. value. All these duties are to be paid by the tawers or makers.

For hides and skins dressed in oil, 6d. a pound; deer, goat, and beaver-skins dressed in oil, 6d. a pound; calve-skins and lamb-skins dressed in oil, 3d. a pound; all skins dressed in oil, not before charged, 15s. in the 100l. according to the real value, all which are to be paid by the oil leather-dressers.

For other regulations, see LEATHER and TANNER.

TAWIXIWI, in Geography, a town of America, on the Miami. N. lat. 40° 35'. W. long. 84° 4'.

TAWNY, in Heraldry. See TENNE.

TAWY, in Geography, a river of South Wales, which rises in Brecknockshire, and runs into the sea at Swansea.

TAX, formed from τΑΧ, order, denotes a certain aid, subsidy, or supply, granted by the common of Great Britain in parliament assembled, constituting the king's extraordinary revenue; and paid yearly towards the expenses of the government. See MONEY-BILLS, PARLIAMENT, and SUPPLY.

Anciently, the tax seems to have been imposed by the king at his pleasure; but Edward I. bound himself, and his successors, from that time forward, not to levy it, but by consent of the realm.

To this purpose the celebrated Mr. Locke, in his "Essay on Government," (ch. xi. § 140.) lays down the following proposition as fundamental. "Tis true, government cannot be supported without great charge; and 'tis fit every one who enjoys his share of protection, should pay out of his estate his proportion for the maintenance of it. But 'till it must be with his own consent, i.e. the consent of the majority, giving it either by themselves, or their representatives chosen by them: for if any one shall claim a power to lay and levy taxes on the people by his own authority, and without such consent of the people, he thereby invades the fundamental law of property, and subverts the end of government. For what property have I in that, which another may by right take when he pleases to himself?"
pockets of the people as little as possible, over and above what it brings into the public treasury of the state." This maxim may be counteracted by requiring for the levying of the tax a great number of officers, whose salaries may consume the greater part of the produce of the tax, and whose perquisites may impose another tax upon the people;—by obstructing their industry and discouraging them from applying to certain branches of business, which might give maintenance and employment to great multitudes;—by the forfeitures and other penalties which those unfortunate individuals incur, who attempt unsuccessfiilly to evade the tax, which may ruin them, and thus put an end to the benefit the community might have received from the employment of their capitals; the penalties of smuggling being so ordered as to rife in proportion to the temptation; and by subjecting the people to the frequent visits and the odious examination of the tax-gatherers, which occasion much trouble, vexation, and oppression.

As the private revenue of individuals arises ultimately from the three different sources of rent, profit, and wages, every tax must finally be paid from one or other of these three different sorts of revenue, or from all of them indifferently. The first kind of taxes comprehends those upon the rent of land. (See Land-tax.) Taxes upon the produce of the land are in reality taxes upon the rent. (See Tithes.) Taxes upon the rent of houses include that which may be called the Building rent, and that which is commonly called the Ground rent; and so far as these fall upon the inhabitants, they must be drawn from the same source as the rent itself, and must be paid from their revenue, whether derived from the wages of labour, the profits of flock, or the rent of land; and it is in every respect of the same nature as a tax upon any other sort of consumable commodities. Houses not inhabited ought to pay no tax; houses inhabited by the proprietor ought to be rated, not according to the expense which they might have cost in building, but according to the rent which an equitable arbitration might judge them likely to bring, if leased to a tenant. Ground rents are still a more proper subject of taxation than the rent of houses, or even the rent of land. The principal objection to all taxes upon houses and windows is their inequality, and therefore they are directly contrary to the spirit of Dr. Smith's maxims above stated. Their natural tendency is to lower rents.

Taxes upon profit, or upon the revenue arising from flock, comprehend the tax upon flock, such as is imposed by the land-tax in England, by which it was intended that the flock should be taxed in the same proportion as the land, and taxes upon the profit of particular employments. Taxes upon the wages of labour must finally fall upon the consumer. Besides the taxes already enumerated, there are others, such as capitation taxes, and taxes upon consumable commodities, which must be paid indiscriminately from whatever revenue the contributors may possess; from the rent of their land, from the profits of their flock, or from the wages of their labour. The impossibility of taxing the people, in proportion to their revenue, by any capitation, seems to have given occasion to the invention of taxes upon consumable commodities; and these are either necessaries or luxuries. A tax upon the necessaries of life operates exactly in the same manner as a direct tax upon the wages of labour, and will fail, if the labourer be employed by a manufacturer, on the consumer; or if he be employed by a farmer, it will fall upon the rent of the landlord. But it is otherwise with respect to taxes upon luxuries. The rise in the price of the taxed commodities, will not necessarily occasion any rise in the wages of labour. Any rise in the average price of necessaries, unless it is compensated by a proportional rise in the wages of labour, must necessarily diminish more or less the ability of the poor to bring up numerous families, and consequently to supply the demand for useful labour; whatever may be the state of that demand, whether increasing, stationary, or declining; or such as requires an increasing, stationary, or declining population. Taxes upon luxuries have no tendency to raise the price of any other commodities except that of the commodities taxed. Taxes upon necessaries, by raising the wages of labour, necessarily tend to raise the price of all manufactures, and consequently to diminish the extent of their sale and consumption. Taxes upon luxuries are finally paid by the consumers of the commodities taxed, without any retribution. They fall indifferently upon every species of revenue, the wages of labour, the profits of flock, and the rent of land. Taxes upon necessaries, so far as they affect the labouring poor, are finally paid, partly by landlords in the diminished rent of their lands, and partly by rich consumers, whether landlords or others, in the advanced price of manufactured goods; and always with a considerable over-charge.

In Great Britain, the principal taxes upon the necessaries of life are those upon salt, leather, soap, and candles. Heavy taxes upon these commodities must somewhat increase the expense of the sober and industrious poor, and must, consequently, more or less raise the wages of their labour. Such taxes, notwithstanding their immediate effect, afford a considerable revenue to government, and accordingly they are continued and multiplied.

Consumable commodities, whether necessaries or luxuries, may be taxed in two different ways. The consumer may either pay an annual sum on account of his using or consuming goods of a certain kind; or the goods may be taxed while they remain in the hands of the dealer, and before they are delivered to the consumer. The consumable goods which last a considerable time before they are consumed altogether, are most properly taxed in the one way. Those of which the consumption is either immediate or more speedy, in the other.

Of the latter kind is the greater part of the duties of excise and excustoms. Thofe of excise are imposed chiefly upon goods of home produce delineated for home consumption; and they are imposed only upon a few sorts of goods of the most general use. The duties of customs are much more ancient than those of excise. (See Customs and Excise.) It is observed that high taxes, sometimes by diminishing the consumption of the taxed commodities, and sometimes by encouraging smuggling, frequently afford a smaller revenue to government than what might be drawn from more moderate taxes.

When the diminution of revenue is the effect of the diminution of consumption, there can be but one remedy, and that is the lowering of the tax.

When the diminution of the revenue is the effect of the encouragement given to smuggling, it may perhaps be remedied in two ways; either by diminishing the temptation to smuggle, or by increasing the difficulty of smuggling. The temptation to smuggle can be diminished only by the lowering of the tax; and the difficulty of smuggling can be increased only by establishing that system of administration which is most proper for preventing it.

The duties upon foreign luxuries imported for home consumption, though they sometimes fall upon the poor, fall principally upon people of middling or more than middling fortune. Such are, for example, the duties upon foreign wines, upon coffee, chocolate, tea, sugar, &c.

The
TAX.

The duties upon the cheaper luxuries of home produce destined for home consumption, fall pretty equally upon people of all ranks in proportion to their respective expenses. The poor pay the duties upon malt, hops, beer, and ale, upon their own consumption: the rich, upon both their own consumption and that of their servants.

The whole consumption of the inferior ranks of people, or of those below the middling rank, it must be observed, is in every country much greater, not only in quantity, but in value, than that of the middling and of those above the middling rank. The whole consumption of the inferior is much greater than that of the superior ranks. Although the expense of people of inferior ranks, taken them individually, is very small, yet the whole mass of it, taking them collectively, amounts always to by much the largest portion of the whole expense of the society; what remains, of the annual produce of the land and labour of the country for the consumption of the superior ranks, being always much less, not only in quantity but in value. The taxes upon expence, therefore, which fall chiefly upon that of the superior ranks of people, upon the smaller portion of the annual produce, are likely to be much less productive than either those which fall indifferently upon the expense of all ranks, or even those which fall chiefly upon that of the inferior ranks; than either those which fall indifferently upon the whole annual produce, or those which fall chiefly upon the larger portion of it.

The best taxes, says Mr. Hume, (vol. i. Eif. 8.) are such as are levied upon consumptions, especially those of luxury; because such taxes are least felt by the people. They seem, in some measure, voluntary: since a man may chuse how far he will use the commodity which is taxed. They are paid gradually and indefinably; they naturally produce sobriety and frugality, if judiciously imposed: and being compounded with the natural price of the commodity, they are fearely perceived by the consumers. Their only disadvantage is, that they are expensive in levying. Taxes upon possessions are levied without expense; but they have every other disadvantage. Most states, however, are obliged to have recourse to them, in order to supply the deficiencies of the other. When a tax is laid upon commodities which are consumed by the common people, the necessary consequence may seem to be, either that the poor must retrench something from their way of living, or raise their wages, so as to make the burden of the tax fall upon the rich; but there is a third consequence, which often follows upon taxes, namely, that the poor increase their industry, perform more work, and live as well as before, without demanding more for their labour. Where taxes are moderate, are laid on gradually, and do not affect the necessaries of life, this consequence naturally follows; and it is certain, that such difficulties are often served to excite the industry of a people, and render them more opulent and laborious than others, who enjoy the greatest advantages. The most pernicious of all taxes are the arbitrary: they are commonly converted, by their management, into punishments on industry; and, also, by their unavoidable inequality, are more grievous than the real burden which they impose. Poll-taxes are commonly arbitrary. A duty upon commodities checks itself; and a prince will find, that an increase of the impost is no increas of his revenue.

After all the proper subjects of taxation have been exhausted, if the exigencies of the state still continue to require new taxes, they must be imposed upon improper ones. It has been well observed, "that oppressive taxation is a monster, which, after devouring every other thing, devours itself at last."

The taxes which are raised on the British subjects are either annual or perpetual. The usual annual taxes are those upon land and malt.

The first of these is the land-tax, for an account of which see Land-taxes.
See also Hidage, Scutage, Tallage, Tenth, Fifteenth, and Subsidy.

The other annual tax is the malt-tax, which is a sum raised every year by parliament ever since 1697. See Malt.

The perpetual taxes are the customs, which are a tax immediately paid by the merchant, although ultimately by the consumer (see Customs); the excise-duty, which is an inland imposition, paid sometimes upon the consumption of the commodity, or frequently upon the retail sale, which is the last stage before the consumption (see Excise); the duty upon malt: that for the carriage of letters or posts; the stamp-duty; the duty upon houses and windows; the duty arising from licences to hackney-coaches and chairs in London, and the parts adjacent; and the duty upon offices and pensions. See Land-taxes, &c. &c.

The afflicted taxes comprehend those on windows, houses, servants, carriages, horses, and mules, dogs, horse-dealers, hair-powder, armorial bearings, and game licences. For those on windows, see the following schedule.

Schedule (A.) 48. G. III. c. 55.

<table>
<thead>
<tr>
<th>Number of windows according to which the duties shall be charged</th>
<th>Duties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not more than 6 windows or lights</td>
<td>£ s. d.</td>
</tr>
<tr>
<td>(except in such houses which shall be worth the rent of 5l. by the year, and shall be charged to the duty mentioned in Schedule (B.), according to the rent thereof)</td>
<td>0 6 6</td>
</tr>
<tr>
<td>Not more than 6 windows or lights, if of the value before-mentioned, and charged to the said duty accordingly</td>
<td>0 8 0</td>
</tr>
<tr>
<td>7 windows or lights</td>
<td>1 0 0</td>
</tr>
<tr>
<td>8</td>
<td>1 1 3</td>
</tr>
<tr>
<td>9</td>
<td>2 0 0</td>
</tr>
<tr>
<td>10</td>
<td>2 1 6</td>
</tr>
<tr>
<td>11</td>
<td>3 1 2</td>
</tr>
<tr>
<td>12</td>
<td>4 9 6</td>
</tr>
<tr>
<td>13</td>
<td>5 6 6</td>
</tr>
<tr>
<td>14</td>
<td>6 3 6</td>
</tr>
<tr>
<td>15</td>
<td>7 0 0</td>
</tr>
<tr>
<td>16</td>
<td>7 1 0</td>
</tr>
<tr>
<td>17</td>
<td>8 1 4</td>
</tr>
<tr>
<td>18</td>
<td>9 1 0</td>
</tr>
<tr>
<td>19</td>
<td>10 7 6</td>
</tr>
<tr>
<td>20</td>
<td>11 4 6</td>
</tr>
<tr>
<td>21</td>
<td>12 1 0</td>
</tr>
<tr>
<td>22</td>
<td>12 1 8</td>
</tr>
<tr>
<td>23</td>
<td>13 1 5</td>
</tr>
<tr>
<td>24</td>
<td>14 1 1</td>
</tr>
<tr>
<td>25</td>
<td>15 8 6</td>
</tr>
<tr>
<td>26</td>
<td>16 5 6</td>
</tr>
<tr>
<td>27</td>
<td>17 1 0</td>
</tr>
<tr>
<td>28</td>
<td>18 1 6</td>
</tr>
<tr>
<td>29</td>
<td>19 1 2</td>
</tr>
<tr>
<td>30</td>
<td>19 2 0</td>
</tr>
<tr>
<td>31</td>
<td>20 9 6</td>
</tr>
<tr>
<td>32</td>
<td>21 6 6</td>
</tr>
<tr>
<td>33</td>
<td>22 3 0</td>
</tr>
<tr>
<td>34</td>
<td>23 0 6</td>
</tr>
<tr>
<td>35</td>
<td>23 1 6</td>
</tr>
<tr>
<td>36</td>
<td>24 1 3</td>
</tr>
</tbody>
</table>
Not more than

<table>
<thead>
<tr>
<th>Description</th>
<th>£</th>
<th>s</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td>37 windows or lights</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>38 - do.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>39 - do.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40 - do.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>41 - do.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>42 - do.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>43 - do.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>44 - do.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

And for every such dwelling-house which shall contain more than 180 windows or lights, for every window or light exceeding the number of 180

See Windows.

Schedule (B.) 48 Geo. III. c. 55. Duties on inhabited dwelling-houses.

For every such inhabited house with the house-hold and other offices, yards, and gardens, therewith occupied and charged, as are or shall be worth the rent herein-after mentioned by the year, there shall be charged the yearly fums following; viz.

<table>
<thead>
<tr>
<th>Rent</th>
<th>Value in the Pound</th>
</tr>
</thead>
<tbody>
<tr>
<td>5l. and under 20l. rent, by the year</td>
<td>0 1 6</td>
</tr>
<tr>
<td>20l. and under 40l. rent, by the year</td>
<td>0 2 3</td>
</tr>
<tr>
<td>40l. rent by the year, and upwards</td>
<td>0 2 10</td>
</tr>
</tbody>
</table>

The duties payable by 48 Geo. III. c. 55. annually for male servants are as below.

Schedule (C.) No. 1.

<table>
<thead>
<tr>
<th>Number of Servants</th>
<th>Amount of Duty for each Servant</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 fuch servant</td>
<td>£ 2 4 0</td>
</tr>
<tr>
<td>2 - do.</td>
<td>£ 2 16 0</td>
</tr>
<tr>
<td>3 - do.</td>
<td>£ 3 7 0</td>
</tr>
<tr>
<td>4 - do.</td>
<td>£ 3 18 0</td>
</tr>
<tr>
<td>5 - do.</td>
<td>£ 4 9 0</td>
</tr>
<tr>
<td>6 - do.</td>
<td>£ 4 14 0</td>
</tr>
<tr>
<td>7 - do.</td>
<td>£ 4 16 0</td>
</tr>
<tr>
<td>8 - do.</td>
<td>£ 5 3 0</td>
</tr>
<tr>
<td>9 - do.</td>
<td>£ 5 12 0</td>
</tr>
<tr>
<td>10 - do.</td>
<td>£ 6 3 0</td>
</tr>
<tr>
<td>11 - do. and upwards</td>
<td>£ 7 1 0</td>
</tr>
</tbody>
</table>

For every such servant retained or employed by any male persons, never having been married, over and above the before-mentioned duties, the further sum of £ 1 14 0

Vol. XXXV.
For every male servant employed as a waiter (except occasional waiters, over and above the ordinary number usually kept) in any taverns, coffee-houses, inns, ale-houses, or other licensed houses, or in eating or victualling houses, or in hotels or lodging-houses, being eating or victualling houses, the sum of £1.4.0.

For every male servant retained by any habitable-keeper to take care of any horse, mare, or gelding, of any other person or persons, kept for the purpose of racing or running for any plate, prize, sum of money, or other thing, or any horse, mare, or gelding, in training for any of the said purposes, whereby such habitable-keeper shall gain a livelihood or profit, the sum of £1.4.0.

For every male servant bonâ fide retained for the purposes of husbandry, manufacture, or trade, by which the master or mistresses shall gain a livelihood or profit, and at any time employed in any domestic employment in any of the capacities in Schedule (C), No. 1, and not chargeable to the duties in the said schedule, the sum of £1.4.0.

For every male servant bonâ fide retained for the purposes of husbandry, or any manufacture or trade, by which the master or mistresses shall gain a livelihood or profit, and at any time employed in the capacity of a groom, habitable-boy, or helper in the habitables, where the master or mistresses shall be chargeable for one horse, and no more, to the duty on horses kept for the purposes of riding, or drawing a taxed cart, or to the duty on such taxed cart, and not on any other carriage chargeable with duty by this act, the sum of £1.4.0.

The said last-mentioned duties to be paid by the employer, or master or mistresses of such persons or servants.

Schedule (C) No. 4. Duties payable on servants let to hire. £1.4.0.

For every coachman, groom, postilion, or helper, kept for the purpose of being let to hire for any period of time less than one year, and in such manner that the stamp-office duty payable by law on horses let to hire shall not be payable on every such letting by any post-mater, inn-keeper, or other person, duly licensed to let post-horses by the commissioners for managing the duties on stamped vellum, parchment, and paper, and wherein the name or names and place of abode of the person or persons so licensed shall be marked or painted, according to the directions of the act in that case made and provided; if such carriage shall have four wheels, the sum of £2.4.0.

The said duty to be paid by the person or persons letting the same to hire.

These several duties are subject to certain exemptions. The provisions of 43 Geo. III. c. 161, relating to the allowances of servants, are as follows. Persons liable to these duties are to return lists of their servants, and are chargeable accordingly from the year commencing from the days stated in their returns; and they are subject to the powers of furecharge. Persons beginning or ceasing to keep servants are to give notice in writing to the ale-flores of the district in which they reside.

£. s. d. Schedule (D.) No. 1. Duties payable on all carriages of any of the descriptions mentioned herein.

| Number of Carriages | Duty for each Carriage | Amount of Duty |
|---------------------|------------------------|----------------|----------------|
| For carriages with four wheels: | | |
| 2 - 50 | - | 11.5.0 |
| 3 - do. | - | 12.7.0 |
| 4 - do. | - | 13.10.0 |
| 5 - do. | - | 14.0.0 |
| 6 - do. | - | 14.12.0 |
| 7 - do. | - | 15.3.0 |
| 8 - do. | - | 15.14.0 |
| 9 - do. and upwards | - | 16.5.0 |
| And for every additional body successively used on the same carriage or number of wheels, the further sum of | - | 5.12.0 |

Schedule (D.) No. 2. For carriages with less than four wheels: £0.6.0.

For every such carriage (except taxed carts, constituted, kept, and used, under the regulations of this act) drawn by one horse, mare, or gelding, and no more | - | 5.18.0 |

And for every such carriage, drawn by two or more horses, mares, or geldings | - | 8.5.0 |

And for every additional body of the description herein-after mentioned, successively used on the same carriage or number of wheels, the further sum of | - | 2.16.0 |

Schedule (D.) No. 3. For carriages hired for any period of time less than one year, or kept to be let to hire, or to carry passengers: £0.6.0.

For every such carriage kept for the purpose of being let to hire, with horses to be used therewith, for any period of time not exceeding twenty-eight days, so that the stamp-office duty, payable by law on horses let to hire shall be duly paid and satisfied on every such letting by any post-mater, inn-keeper, or other person duly licensed to let post-horses, by the commissioners for managing the duties on stamped vellum, parchment, and paper, and wherein the name or names and place of abode of the person or persons so licensed shall be marked or painted, according to the directions of the act in that case made and provided; if such carriage shall have four wheels, the sum of £9.9.0.

And if such carriage shall have less than four wheels, the respective sums mentioned in Schedule (D) No. 2, according to the number of horses used therewith, as therein mentioned.

And for every coach, diligence, caravan, or chaise with four wheels or more, or other carriage with four wheels or more, by whatever name the same shall be called or known, which shall be kept and employed as a public stage-coach or carriage for the purpose of conveying passengers for hire to and from different places, and which shall be duly entered as such with the said commissioners of stamp duties, the like sum of £9.9.0.

All
TAX.

All which last-mentioned duties shall respectively be paid by the person or persons keeping the same, for the purposes aforesaid.

For every carriage kept for the purpose of being let to hire for any period of time less than one year, and in such manner that the said lamp-office duty shall not by law be payable on such letting by any person so licensed as aforesaid, or by any coach-maker or maker of such carriages, or other person, if such carriage shall have four wheels, the annual sum of £11 5s. 0d.

The said last-mentioned duty to be paid by the person or persons keeping the same for the purposes aforesaid.

Provided, if a due return thereof shall not be made by the hirer or hirers according to the directions of the acts herein mentioned, the progressive duty, as set forth in Schedule (D.) No. 1, shall be chargeable in respect of every such carriage on the person or persons hiring the same, and making such default as aforesaid, subject to the provisions contained in the said acts concerning the same.

And if such carriage shall have less than four wheels, the respective sums mentioned in Schedule (D.) No. 2, according to the number of horses to be used therewith, to be paid by the person or persons keeping the same for the purposes aforesaid, subject to the provisions herein-after contained concerning the same. See Coach and Taxed Cart.

By 50 Geo. III. c. 104. certain new duties are imposed.

A Schedule of the Duties payable on Carriages called Taxed Cart.

No. I.

For every carriage called a taxed cart, built and constructed according to the regulations of the said act, in every respect the original price of which shall not have exceeded, or the value whereof shall not at any time exceed the sum of £15. is, and which shall not at any time be used with a covered or fluted seat, or with a covered foot-board or apron thereto fixed or not fixed, there shall be charged the annual sum of £1 6s. 6d.

No. II.

For every such carriage called a taxed cart, built and constructed with a spring or springs of any materials whatever, (except of iron, steel, or any other metallic substance, or any composition of iron, steel, or other metallic substance, either wholly or in part,) the original price of which carriage shall not have exceeded, or the value whereof shall not at any time exceed the sum of £20. is, or which shall be used with a fluted seat or cushion, or with a covered foot-board or apron thereto fixed or not fixed, there shall be charged the annual sum of £2 10s. 0d.

A Schedule of the Duties payable on Carriages with less than Four Wheels.

No. III.

For every carriage with less than four wheels chargeable by the said act of the forty-eight years of his present majesty’s reign with the duty of £1 18s. if drawn by one horse, mare, or gelding, and no more, there shall be charged the like amount of duty for every such carriage drawn by one horse, mare, gelding or mule, and no more, viz. the annual sum of £5 18s. 0d.

For every such carriage chargeable by the said act with the duty of £1 18s. if drawn by two or more horses, mares, or geldings, there shall be charged the like amount of duty for every such carriage drawn by more than one horse, mare, gelding or mule, viz. the annual sum of £8 5s. 0d.

And for any additional body successively used on the same carriage or number of wheels chargeable by the said act with the further duty of £1 18s. there shall be charged the like amount of additional duty, for every additional body successively used on the same carriage or number of wheels, if drawn in the manner herein mentioned, viz. the further annual sum of £2 16s. 0d.

Schedule (E.) No. 1. Duties payable for all horses, mares, and geldings, kept and used for the purpose of riding, or of drawing any carriage chargeable with duty by Schedule (D.)

<table>
<thead>
<tr>
<th>Number thereof</th>
<th>Amount of Duty for each Horse, Mare, or Gelding</th>
</tr>
</thead>
<tbody>
<tr>
<td>For 1 such horse, mare, or gelding</td>
<td>£2 13s. 6d.</td>
</tr>
<tr>
<td>2 such horses, mares, or geldings</td>
<td>£4 9s. 6d.</td>
</tr>
<tr>
<td>3</td>
<td>£4 18s. 0d.</td>
</tr>
<tr>
<td>4</td>
<td>£5 2s. 0d.</td>
</tr>
<tr>
<td>5</td>
<td>£5 3s. 0d.</td>
</tr>
<tr>
<td>6</td>
<td>£5 7s. 0d.</td>
</tr>
<tr>
<td>7</td>
<td>£5 10s. 0d.</td>
</tr>
<tr>
<td>8</td>
<td>£5 10s. 0d.</td>
</tr>
<tr>
<td>9</td>
<td>£5 12s. 0d.</td>
</tr>
<tr>
<td>10</td>
<td>£5 17s. 6d.</td>
</tr>
<tr>
<td>11</td>
<td>£5 17s. 6d.</td>
</tr>
<tr>
<td>12</td>
<td>£5 17s. 6d.</td>
</tr>
<tr>
<td>13</td>
<td>£5 18s. 0d.</td>
</tr>
<tr>
<td>14</td>
<td>£5 18s. 0d.</td>
</tr>
<tr>
<td>15</td>
<td>£5 18s. 0d.</td>
</tr>
<tr>
<td>16</td>
<td>£5 18s. 0d.</td>
</tr>
<tr>
<td>17</td>
<td>£5 18s. 0d.</td>
</tr>
<tr>
<td>18</td>
<td>£5 19s. 6d.</td>
</tr>
<tr>
<td>19</td>
<td>£6 0s. 0d.</td>
</tr>
<tr>
<td>20 and upwards</td>
<td>£6 1s. 0d.</td>
</tr>
</tbody>
</table>

Rules.—The said duties to be payable annually for every horse, mare, or gelding, used on any occasion for the purpose of riding, or of drawing any carriage for which any duty is payable by this act, or hired by the year, or any longer period, and to be paid by the person or persons using the same. These duties are subject to certain exemptions in favour of husbandry, under certain circumstances.

Schedule (E.) No. 2. Duties payable on horses let to hire.

For every horse, mare, or gelding, let to hire for the purpose of riding, or of drawing any such carriage as aforesaid, for any period of time less than one year, in any manner so that the lamp-office duty payable by law on horses let to hire shall not be payable, the sum of £2 13s. 6d.
To be charged annually on the person or persons letting the same; provided, if a
due return thereof shall not be made by the hirer or hirers, according to this act,
the progressive duty, as set forth in Schedule (E.) No. 1, shall be chargeable
in respect of every such horse, mare, or gelding, on the person or persons hiring
the same, and making such default as aforesaid, subject to the provisions of this
act.

Schedule (E.) No. 2. Duties payable on horses kept for
the purpose of racing or running for any plate, prize, or
sum of money, or other thing, or kept in training for any
of the said purposes.

For every horse, mare, or gelding, bond fide kept for
the purpose of racing or running for any plate, prize, or sum of money, or other thing, or kept in training for any of the said purposes, whether in the hands of the proprietor or proprietors, or of any other person or persons, the sum of £ s. d.
The said duty to be charged annually on the
person or persons having the custody, charge, or management of such horses, mares, or geldings.

Schedule (F.) No. 1. Duties payable for all horses,
mares, and geldings, not charged with any duty according to the Schedule (E.) No. 1, 2, 3, and also on mules.

For every horse, &c. not chargeable with any duty according to the Schedule (E.) No. 1, 2, and 3, as aforesaid, and for every mule, except in the cases herein-after mentioned, where
in other duties are made payable, the sum of £ s. d.

Schedule (F.) No. 2. Duties payable on husbandry-horses,
in the cases herein-after mentioned.

Any person occupying a farm at rack-rent, the
rent of which shall be less than 10l. a-year, and making a livelihood solely thereby, or occupying any estate on any other tenure than as tenant at rack-rent solely, or such other estate, together with the farm at rack-rent, the value of which in the whole shall be less than equivalent to a farm at the rack-rent of 20l. a-year (reckoning the value of every estate occupied by the owner thereof, or on any tenure other than as tenant at rack-rent, as equivalent to double the amount of the like farm, at rack-rent), and making a livelihood solely by such his own estate, or by such estate and farm jointly, or principally thereby, and likewise a profit by any trade or employment, and keeping not more than two horses, mares, geldings, or mules, bond fide for the purpose of such occupation, shall be charged for each of such two horses, mares, geldings, or mules, the sum of £ s. d.

Any person occupying a farm at rack-rent in
Wales or Scotland, the rent of which shall be less than 10l. sterling a-year, and making a livelihood principally thereby, or occupying any estate on any other tenure than as tenant at rack-rent, or such other estate, together
with a farm at rack-rent, the value of which in the whole shall be less than equivalent to a farm at the rack-rent of 10l. a-year (reckoning the value of every estate occupied by the owner thereof, or on any tenure other than as tenant at rack-rent, as equivalent to double the amount of the like farm, at rack-rent), and making a livelihood principally thereby, and likewise a profit by any trade or employment, and keeping not more than two horses, mares, geldings, or mules, bond fide for the purposes of such occupation, and of such trade or employment jointly, or either of them separately, shall be charged for each of such two horses, mares, geldings, or mules, the sum of £ s. d.

Rules for charging the duties, as set forth in Schedule (F.)
No. 1 and 2.
The said duties to be charged annually, and paid by the
person or persons keeping or using such horses, mares, geldings, or mules, and to be payable for every horse, mare or gelding, and mule, which shall not be chargeable nor have been charged with any duty payable in that year, ac-
cording to the preceding schedule marked (E.) by virtue of the rules or exemptions therein contained, except as herein-after is mentioned.

Exemptions from the duties in Schedule (E.) No. 1 and 2.
Any person whatever, for any horse, mare, or gelding, not being by due admeasurement of the height of thirteen hands, of four inches to each hand, or which shall not at any time whatever have been used for any purpose of labour or otherwife. See Horses and Horse-Dealer.

Schedule (G.) No. 1. Duties payable on dogs.
For every greyhound, hound, pointer, setting-dog, spaniel, lurcher, or terrier, the annual sum of £ s. d.
For every dog, of whatever description or denomi-
nation the same may be, where any person shall keep two or more dogs, either for his or her own use, or the use of any other person or persons, the annual sum of £ s. d.
For every dog not being a greyhound, hound, pointer, setting-dog, spaniel, lurcher, or terrier, kept by any person having one such dog, and no more, whether the same be kept for his or her own use, or the use of any other person or persons, the annual sum of £ s. d.
The said duties to be paid by the persons respectively keeping such dogs.

Exemptions from the duties in Schedule (G.)
Case 1.—Any dog belonging to his majesty, or any of the royal family.
Case 2.—Any person who, on account of poverty, shall be discharged from the affemment made in respect of his or her dwelling-house, in pursuance of the regulations of any of the acts herein-mentioned, and having one dog, and no more, the same not being a greyhound, hound, pointer, setting-dog, spaniel, lurcher, or terrier.
Case 3.—Any person, in respect of a dog or whelp, which at the time of returning the lists of dogs as by this act is required, shall not actually be of the age of six calendar months.

Case 4.
TAX.

Scheduie (H.) Duties payable by horfe-dealers.

Every person who shall uf or exercise the trade and businesses of a horfe-dealer within the cities of London and Westminster, and the liberties of the fame respectfly, the parishes of St. Mary-le-Bone and St. Pancras, in the county of Middlesex, the weekly bills of mortality, or the borough of Southwark, in the county of Surrey, the annual duty of £ 22 10 0.

Every person who shall use or exercise the trade and businesses of a horfe-dealer in any other part of Great Britain, the annual duty of £ 11 5 0.

Schedule (I.) Duties payable by perfons in refpect of hair-powder ufed or worn by them.

By every person who shall have used or worn any hair-powder within the period limited by any of the acts herein mentioned, the annual sum of £ 1 3 0.

By every fuch perfon chargeable with any duty made payable by this act, for any coach or other carriage, the annual sum of £ 2 8 0.

By every fuch perfon not chargeable for any fuch coach or other carriage, but who fhall be chargeable to any of the duties on inhabited houfes, or to the duties on houfes, windows, or lights, made payable by this act, the annual sum of £ 1 4 0.

By every fuch perfon not chargeable for any fuch coach or other carriage, nor being chargeable to the faid duties on inhabited houfes, or to the duty on houfes, windows, or lights, the annual sum of £ 0 12 0.

Schedule (L.) Duties payable in refpect of killing game.

Upon every person who shall use any dog, gun, net, or other engine, for the purpofe of taking or killing any game whatsoever, or any wood-cock, faufe, quail or landrail, or any conies, in any part of Great Britain:

If fuch perfon fhall be a fervant to any perfon duly charged in refpect of fuch fervant to the duties granted on fervants by this act, and fhall use any dog, gun, net, or other engine, for any of the purpofes before-mentioned, upon any manor or royalty in England, Wales, or Berwick-upon-Tweed, or upon any lands in Scotland, by virtue of any deputation or appointment, duly registered or entered as game-keeper thereto, there fhall be charged the annual sum of £ 1 1 0.

And if fuch perfon as laft aforesaid fhall not be a fervant, for whom the faid duties on fervants fhall be charged, there fhall be charged the annual sum of £ 3 3 0.

Upon every other person who fhall use any dog, gun, net, or other engine for any of the purpofes before-mentioned, there fhall be charged the annual sum of £ 3 3 0.

By the 46 Geo. III. c. 84. every perfon having more than two children born in lawful wedlock, and bonus fide maintained at the expence of fuch perfon, fhall for every fuch child above two be allowed at the rate of 4 per cent. on the amount of all the afligments on fuch perfon by virtue of the 43 Geo. III. c. 161. 45 Geo. III. c. 13. 46 Geo. III. c. 75. in cafe the total amount of all the afligments fhall be under £ 40. in any one year, which allowance fhall be made annually out of the duties fo charged, at any time in the year of afligment, on delivery of a declaration in writing, containing the whole number of fuch children, and their refpective names and places of residence, and which of them are of the family, or refide elsewhere.

By f. 2. this provision fhall extend to children by a former marriage, either of the husband or wife.

The statute 43 Geo. III. c. 99. reciting that it is expedient that certain of the provisions contained in any acts relating to the duties on windows or lights, on inhabited houses, fervants, carriages, horfes, mules, and dogs, and other duties lately transferred to the commiffioners for the affairs of taxes, fhould be confolidated and amended; enacts that all the faid duties under the management of fuch commiffioners (except the land-tax) fhall, from and after April 5, 1804, be afliged, raised, levied, and paid under the regulations thereof.

And as new duties may hereafter be placed under their management, to be afliged in like manner, it is declared that this act fhall, with refpect to fuch duties, take effect after the time fixed by the act or acts granting them for the commencement of the fame. See the provisions of this act detailed in Burn's Juriflice, ubi supra.

The property-tax being now extinct, we are happily relieved from giving any account of it.

For the qualifications and powers of commiffioners, the appointment of affiffors and commiffioners, the mode of making afligments, furcharges, appeals, &c. &c. we refer to Burn's Juriflice, art. Taxes.

For the duty on poft-horfe, &c. see Post-Horfe.

The revenue afpiring from the feveral taxes, which is annually paid to the creditors of the public, or carried to theinking fund, is firfl printed in the royal exchequer, and thence flied out to the refpective offices of payment; for the manner in which it is applied, see Fund and National Debt. See also Revenue.

The people of France were fanctions to tailors or taxes till the time of St. Louis, when they were firfl imposed in form of subsidies necessary for the support of the war in the Holy Land. See Croifade.

They were then extraordinary levies, and were raised by capitation; but they were afterwards made perpetual under Charles VII. and Philip the Fair, who, to raise money without disturbing the people, called the people, as a third estate, into the general councils of the realm.

Tax also denotes the tribute which tenants were occa-}

ionaly to pay their lord.

Most lords had a right of taxing on four occasions: viz. when the lord was taken prisoner in a juft war; when he made
made his eldest son a knight; when he married his eldest daughter to a gentleman; and when he made the voyage of the Holy Land.

Naude founds the extravagant use of this kind of taxes; those, he observes, which under Charles V. only amounted to the sum of 40,000 livres, were increased under Charles VII. to the sum of 1,800,000; under Louis XI. to 4,740,000; under Charles VIII. to 6,000,000; and under Louis XII. to 7,640,000 livres.

Taxes were distinguished into free, which were those due, in the four cafes, by freemen, or those who held free lands; and servile and labor, which were those due from persons of bafe condition.

They were also distinguished into real and personal. The personal were imposed on the head of the servant or man in mainmote, and so followed wherever he went. TAXA, in Geography, one of the small Western islands, near the south-east coast of Hay. N. lat. 55° 43'. W. long. 6° 3'.

TAXAMALCA, a town of Mexico; 60 miles S. of Mexico.

TAXAMARCA, a town of Mexico, in the province of Mechoacan; 40 miles E. of Mechoacan.

TAXANTHEMA, in Botany, so named by Necker, from ταξάν, a row, and ηθημα, information, because some of the plants on which this supposed genus is founded differ from other species of Statice, in having their flowers disposed in a regular series, or row, and not in a round head; witness S. Limonium and its allies. These species indeed constitute Tournefort's genus of Limonium, but he associates with them others with dispersed flowers. (See Statice and Limonium.) Mr. Brown, Prodr. Nov. Holl. v. 1. 426, adopts Necker's genus and name, citing Tournefort's Limonium as a synonym. The latter name was probably judged too near Limonia to be retained. We probably to think the genus of Statice is itself so natural, and so well distinguished from every other, that if a practical example were desired, to warn us against founding generic distinctions upon inflorescence alone, no better could be selected. See Cyme and Genus.

TAXERS, two officers yearly chosen in Cambridge, to see the true gauge of all weights and measures observed. The name took beginning from taxing and rating the rents of houses, which was anciently the duty of their office.

TAXGUTIUM, in Ancient Geography, a town of Rhætia, towards the source of the Rhine, near Brigantium. Ptol.

TAXIANA, an island situated in the Persian gulf, on the coast of Susiana, west of the isle of Tabiana. Ptol.

TAXILA, a large town of India, on this side of the Ganges. Ptol. and Strabo.

TAXIMIRA, a town of Phœnicia. Strabo.

TAXIPA, in Geography, a town of Mexico, in the province of Guatleca; 30 miles N.N.W. of Panuco.

TAZIS, ταξις, in the Ancient Architecture, signifies the same with ordainance in the new, and is described by Vitruvius to be that which gives every part of a building its just dimensions with regard to its use.

Taxis, from ταξις, to put in order, in Surgery, the operation of reducing a hernia with the hand. See a particular account of it in the article Hernia.

TAXITLAN, in Geography, a town of Mexico, in the province of Guatleca; 38 miles S. of St. Yago de los Valles.

TAXUS, in Botany, the ancient Latin name of the Yew-tree, used by Phiny. The word is supposed by some to be derived from ταξις, a bow, arrow, or dart, because missile weapons were poisoned with its berries. We are confident that this precise explanation is erroneous, because, whatever may be the noxious qualities of any other part of the plant, the berries are simply mucilaginous and facelina, eatable with impunity; as we have often experienced. The ancient use of this wood for bows, perhaps also for arrows or darts, might more truly account for the above etymology, did not Diofracides expressly tell us ταξις was Latin. — Linn. Gen. 532. Schreb. 706. Willd. Sp. Pl. v. 4. 856. Mart. Mill. Dict. v. 4. Sm. Fl. Brit. 1086. Prodr. Fl. Græc. Sibth. v. 2. 265. Ait. Hort. Kew. v. 5. 415. Pursh 647. Jull. 412. Lamarck Illufr. t. 829. Gartn. t. 91. — Chas and order, Dictio Monadelphus. Nat. Ord. Confere, Linn. Jull.

Gen. Ch. Male, Cal. none, except the seals of the bud, resembling a perianth of four leaves. Cor. none. Stam. Filaments numerous, united below into a column, longer than the bud; anthers deprest, blunt, with eight notches, at the edge, splitting all round at the base, and after shedding their pollen becoming flat and peltate, remarkable for their eight marginal segments.

Female, Cal. inferior, of one leaf, close, undivided, entire. Cor. none. Pet. German superior, ovate, acute; style none; stigma obtuse. Peric. none, except a juicy incomplete berry, formed of the calyx elongated into a globose juicy coloured sheath, open at the top, at length shrivelling and drying away. Seed one, ovate-oblong, projecting with its summit beyond the berry.


Female, Calyx cup-shaped, entire. Style none. Seed one, partly enveloped in the pulpy calyx.

Obf. Linnaeus properly mentions that the berry of this genus cannot, strictly speaking, be denominated a pericarp.

"It is a remarkable speery of berry, like which nothing else is to be seen, except perhaps in Gaultheria." If the analogy here cited be just, the part in question is a real calyx, not more extraordinary in its change than that of Bittium, or of Morus, and we have always ventured to term it fuch, trufting to the analogies of Juniperus and Ephedra for our support.

1. T. baccata. Common Yew. Linn. Sp. Pl. 1472. Willd. n. 1. Fl. Brit. n. 1. Engl. Bot. t. 746. (Taxus) Ger. Em. 1750. Matth. Valgr. v. 2. 444. Camer. Epit. 840. — Leaves linear, two-ranked, crowded, nearly flat. Male flowers globose. Native of mountainous woods, particularly in the cliffs of high calcareous rocks, in various parts of Europe, from Norway to Greece, flowering in March or April. Diofracides indeed, who calls this tree σπόρων, speaks of it as an exotic, the ταξις of the Romans; but Mr. Hawkins noticed it wild on the rocks of Mount Cyllene in Laconia. Thunberg says it is common in Japan. The trunk is straignt, of slow growth, with a smooth deciduous bark, and very hard, tough, close-grained wood. Branches spreading horizontally in two directions. Leaves numerous, scattered, crowded, spreading in two rows, nearly fellese, linear, entire, slightly revolute, obtuse with a small point, smooth, of a dark shining green, permanent, about an inch long. Flowers axillary, solitary, nearly fellese, enveloped with imbricated bracteas; the male ones numerous, sometimes two or three together, creamy-coloured, half the size of a pea, globose, abounding with pollen; females drooping, their green entire calyx just visible behind the bracteas. This afterwards assimilates the appearance of a bright scarlet berry, the size of a currant, open at the top, where the feed appears. The leaves are very poisonous, and if accidentally eaten by domestic cattle, prove fatal. The ancients
ancients report that it is dangerous to sleep under this tree. It was formerly much planted in church-yards; and many Yews, perhaps "the tenants of a thousand years," still remain in the northern and Welsh village cemeteries. This was the favourite tree for clipping into any fantastic shape, on which art our old gardeners so much valued themselves; but the art and the material are now nearly alike discarded; and the garden is free from one of the greatest aylums for vermin, the trim yew hedge.

2. **Taxus canadensis.** North American Yew. Willd. n. 2. Pursh n. 1. (T. baccata 2, minor; Michaux Boreal.-Amer. v. 2: 245.) — Leaves linear, two-ranked, crowded, revolute. Male flowers globose, always solitary. In flaky rocky places in North America, flowering in March and April. In Canada. **Michaux.** Covering a great part of the rocky banks of the Antietum, in Maryland. Under the shade of other trees, it does not rise above two or three feet. **Parke.** Michaux describes this species as of humbler growth than the former, spreading, and with smaller flowers and fruit. Willdenow says it is smaller and narrower in all its parts, nor does it alter by culture, and yet a specific distinction is hardly to be detected. The leaves, however, are narrower, smaller, and revolute at the margin. Male flowers always solitary in the b Jimmy of the leaves.

3. **T. elongata.** Long-leaved American Yew. **Ait. ed. 1.** v. 3: 415. ed. 2. n. 3. Willd. n. 3. Thumb. Prodr. 117. — Leaves scattered, linear-lanceolate. Branches somewhat whitened. Male flowers cylindrical, with spirally imbricated, very numerous, annules. — Native of the Cape of Good Hope. Sent to Kew in 1772, and kept in several curious greenhouses in England as well as on the continent, flowering in July. Wild specimens, anmiering to Thunberg's character of the whorled branches, but without a name, are preferred in the Linnaean herbarium. In thefe the leaves are scattered, on short broad stalks, flat, coriaceous, somewhat glaucous, occasionally falcate, from one to two inches long. **Male flowers axillary, solitary, cylindrical, obtuse, about half an inch in length, their scale-like anthers imbricated, exactly like those of A.** The garden plant has leaves half as long again, not glaucous, sometimes opposite on the young branches.

4. **T. montana.** Mountain Peruvian Yew. Willd. n. 4. — "Leaves two-ranked, linear, with a callous point; their upper edge rounded at the base; lower contracted." — Gathered by Humboldt and Bonpland on the mountains of Peru. Akin to **T. baccata**, but differing in the above character of the foliage. The fame travellers noticed, in Mexico, what Willdenow judged to be a mere variety of this species, with leaves half as long again.

5. **T. mucronata.** Acorn-bearing Yew. **Linn. Sp. Pl.** 1: 1472. Willd. n. 5. Ait. n. 3. Thumb. Jap. 275. Kempf. Am. Exot. 814. t. 815. — Leaves two-ranked, distant, lanceolate, pointed, but half the length of the fruit. — Frequent, according to Kempfer, in the northern provinces of Japan, flowering in spring, and ripening fruit late in autumn. Thunberg observed it here and there near Nagasaki, and in the island of Nipon. Mr. Atton says it was cultivated in the greenhouse of Capt. Thomas Corwall, in 1764. We have never examined this species. Kempfer describes it as a lofty tree, with many opposite feally branches; the wood light. Leaves hardly an inch long, one-third of an inch asunder, nearly fleshy, tipped with a short point; dark shining green above; glaucous beneath. Female flowers axillary, solitary, falcate, somewhat quadrangular, their thick fleshy scales becoming a sort of permanent cup at the base of the seed, or nut, which is coated, oval, pointed, above an inch long. The oil of the kernel itself is too astringent to be eaten in general.

6. **T. macrophylla.** Long-leaved Japan Yew. **Thumb. Jap.** 276. Willd. n. 6. Ait. n. 4. Banks l.c. Kempf. t. 21. (Sin. vulgo Maki, feu Pon Maki, id est Maki legíima; Kempf. Am. Exot. 780.) — Leaves scattered, lanceolate, pointed, spreading every way. Fruit flaked. — Common in Japan, flowering in June. **Thunberg.** Mr. William Kerr brought it from China to Kew in 1804. A greenhouse plant, flowering in July and August. **Aiton.** Kempfer describes this as a large and stout tree, whose wood is valued for cabinet work, being not liable to the attacks of insects, or other causes of decay. The leaves are a finger's length, spreading equally in all directions; their leaving. Male flowers cylindrical. Fruit axillary, flaked, with a pair of awl-shaped revolute scales at the top of the thistle. The seed is oval, the size of a pea, and seems by Kempfer's figure to be elevated on a partial thistle above the fleshy calyx. Thunberg, however, speaks of the "ovate smooth green berry, turning black in drying, filled by an ovate white seed." Perhaps this may be a coated nut, as in **T. mucronata**.

7. **T. spinulosa.** Spiny-leaved Yew. — Leaves partly opposite or whorled, lanceolate, spinous-pointed, spreading every way. Fruit flaked. — For a specimen of this, said to have been brought by governor Philip from Port Jackson, New South Wales, we are indebted to A. B. Lambert, esq. It very much resembles Kempfer's plate of the plant, in general habit, but the leaves are hardly an inch and quarter long, and have each a spinous point. The thorns of the fruit are axillary, each crowned with a pair of lanceolate, revolute, permanent scales. Fruit oval, elevated on a thistle, which is equal in length to the calyx, composed of several fleshy scales, that envelopes it. The size and whole appearance of this fruit and its accompaniments are so precisely like Kempfer's figure of the plant, which indeed they help us to understand, that these two plants must be of the same genus, and are more truly perhaps akin to **T. mucronata**, than to **T. baccata**. On this subject we may expect information hereafter from Mr. Brown; if at least our present plant be really a native of New South Wales.


9. **T. sikkimensis.** Sickle-leaved Cape Yew. **Thumb. Prodr.** 117. Willd. n. 8. — "Leaves flat, lanceolate, falcate, smooth." — From the same country, One of our wild specimens of **T. elongata** answers to this description.

10. **T. tomentosa.** Downy Cape Yew. **Thumb. Prodr.** 117. Willd. n. 9. — "Leaves opposite, lanceolate, downy beneath." — Gathered at the Cape by Thunberg, whose specific characters of these species, except of the leaf, are not sufficient to distinguish them from the rest. We have seen no specimens.

11. **T. verticillata.** Whorled Japan Yew. **Thumb. Jap.** 276. Willd. n. 10. (Ken sin, item Sen badu, vulgo Tto Maki, id est Maki sinuosa; Kempf. Am. Exot. 780.) — Leaves whorled, linear, falcate. — Native of Japan. A tree with dense branches, gradually shorter upward, so as to assume a conical figure, like a Cypress, three fathom high. Fruit oblong, in two divisions; the lower part resembling muff-leaves; the upper a grain of pepper, in which is loosely enclosed a fleshy, soft, sweetish kernel. Such is Kempfer's description, by which it is easy to perceive the close resemblance of this fruit to our **T. macrophylla** and **spinulosa**. A specimen from Thunberg, without fructification, in the Linnaean herbarium, answers well to his own description.
tion, having round, smooth, greyish branches. Whorls from one to two inches asunder, each of about eight seifile, linear, falcate, entire, smooth, single-ribbed leaves, a finger's length, or more; two lines broad; obtuse, or slightly emarginate, at the end; of a dark shining green above; paler beneath.

**Taxus, in Gardening.** Furnishes a plant of the hardy evergreen kind, of which the species mostly cultivated is the common yew-tree (T. baccata). This is a tree which has several varieties, as those with very short leaves, with broad shining leaves, and with fringed or variegated leaves.

**Method of Culture.**—In this tree, the increase may be effected in several ways, as by seeds, and sometimes by layers and cuttings. In the first mode, after having procured a quantity of the year's berries, and divested them of the pulp or mucilage, they should be sown in beds of light earth, either in shallow drills, or scattered over the surface in the autumn or spring season; but the former is the best method, as the plants rise in the following spring; and be covered near an inch deep with light mould, out of the alleys, &c. They require no further care, only to keep the beds clean from weeds before and after the plants come up, and to give occasional waterings in dry weather, in spring and summer, to forward and strengthen the plants in their growth. They should have two years' growth in the feeding bed; then in the autumn or spring be planted out upon four-feet-wide beds, in nursery rows, a foot asunder, to remain two, three, or four years, when some may be planted out finally for hedges, where required; others in the nursery quarters, in rows, two or three feet asunder, to be trained in a suitable manner for the purposes they are intended.

And after growing in the nursery till they obtain from half a yard to four or five feet stature, they may be finally planted out in autumn or spring, for their intended purposes; when they will rise from the ground with a large spread of roots. They should be planted in their places as soon after removal as possible, giving each plant a good watering at the time.

In the future culture, those trained in hedges, &c. must be clipped or cut in annually, once or twice in the summer; and those in the shrubberies and rural plantations have the lower branches pruned up occasionally to a single item; but the head should generally be permitted to spread agreeably to its natural mode of growth, except just reducing any considerable rambling branch, &c.

But the fringed or variegated yews, and other varieties, should be increased by layers, slips or cuttings, as they are rarely permanent by seeds. The layers should be made from the young shoots of not more than a year or two old, being laid down in spring, summer, or early in autumn, when many of them will take root, and in one or two years be fit for planting off into nursery rows.

And the slips and cuttings should be made by cutting or slipping off a quantity of the one-year's shoots, divesting them of the lower leaves, and planting them in a shady border thick together, in small trenches, in the early spring or autumn, giving water at planting, and afterwards occasionally in dry hot weather. They will be well rooted in two years, and be fit for being planted out into wide nursery rows, or in any other similar manner.

All these plants may be employed as ornamental evergreens, and as forest-trees; and they were formerly much used in hedges and trained figures: they have a good effect in shrubberies among others of the evergreen tribe, being permitted to assume their natural growth, in common with other trees and shrubs; and also when planted as detached standards, in extensive dilated opens of grass-ground, in parks, and the sides of hills, &c.; likewise when introduced as forest-trees in timber plantations of the evergreen kind. See Plantation.

The different sorts of hedges and figure-works which were formerly in so high repute in gardens and pleasure-grounds, are now almost wholly in disuse, these being at present laid out in a more open and rural manner, so as to have a greater imitation of nature, and a more full display of their several quarters and parts, as the lawn, walks, and other places, together with the various plants belonging to them.

Single yews are now even hardly ever admitted in modern designs by way of ornament, but these trees, in their natural growths, are desirable for introducing into large plantations of the evergreen kind, for the sake of increasing the variety; and though some persons reject them in consequence of their poisonous nature, and gloomy mournful aspect, others admire them for such solemn appearances, and think they afford a remarkably fine contrast with the other more lively evergreens. There can be no doubt that the leaves, especially when withered, or dried a little, are of a poisonous quality; besides, the tree has had the title of the deadly yew given to it by some, and been looked upon as an emblem of mortality, and on that account planted in church-yards, to remind people of their latter end. That accidents have frequently arisen to cattle, of both the horse and cow kind, from eating the green leaves and tender shoots, but more particularly when in the above states, is certain. Therefore, as the cuttings or clippings of the sort are often liable to be eaten with greediness by some cattle, particularly cows, even when they have lain in the sun for a day or two, and are become half dried, it is proper and necessary that they should be either carefully delayed by fire, or put quite out of the way of all sorts of animals, and not, as is too frequently the practice, be carelessly thrown over the walls or hedges, into the roads, lanes, or on the rubbish heaps, where cattle frequent.

The best sizes of yew plants are probably from two or three, to five or six feet in height; but those of seven or eight may be removed with balls of earth about their roots, and be used for particular purposes and occasions. Watering at the time of planting them is constantly requisite.

**Taxus, in Zoology,** the Ursus Male, or common Badger; which see.—Also, a name given by Kempter to the hyena of the ancients. See Canis Hyena, and HYENA.

**TAY, in Geography,** is a river in Perthshire, Scotland, considered as the greatest of the Scotch rivers, has its fountain in the western extremity of the county, in the district of Breadalbane, on the frontiers of Lorn, in Argyleshire; but has not the appellation of Tay till it issues from the lake of that name. At its source it bears the name of Fillan; and descending in a circuitous course of eight or nine miles through a valley, to which it gives the name of Strathfillan, it falls into Loch Dochart. This lake, about three miles in length, has an ancient castle upon an island, overhanging by a huge promontory; the whole embowered with wood, so as to have a most romantic appearance. Issuing from Loch Dochart, the river retains that name, and gives the appellation of Glen-Dochart to the vale through which it runs. At the eastern extremity of this valley, the water is again detained in its course; and being augmented by the river Lochay, the united streams form one of the most beautiful of the Scotch lakes, called Loch Tay. Issuing hence, the river assumes the name of the lake, which name it retains till it mingleth with the waters of the ocean. The valley through which it passes may be considered as the paradise of the Highlands. On Loch Tay, and the river for some
fome miles below it, the banks are richly cultivated, or covered with beautiful plantations, the whole overlooked and sheltered by mountains towering to the clouds; among which rises the lofty Benlawers, the third mountain in point of height in the island. Here, near the village of Kenmore, is the magnificent seat of the earl of Breadalbane, called Taymouth; and in this valley, although the parishes are twenty, thirty, or forty miles in extent, several parish-churches are situated in a tract of a few miles; a circumstance which demonstrates the deference of the clergy in ancient times in selecting their place of residence. After leaving the lake about two miles, the Tay acquires a great inerease from the waters of the Lyon; at Logierat it receives the united streams of the Garry and the Tummel, and becomes a river of uncommon size and beauty. Near Dunkeld it is increased by the waters of the Braan, and receiving in its course the Illa, with its tributary streams from the eait, and the Almond from the west, proceeds by Perth between the hills of Kinmore and Moncrieff, till it meets the Earn, after which it proceeds eastward, forming the estuary or Frith of Tay; which expands to the breadth of three miles, but contracts to two miles as it approaches Dundee, about eight miles below which, it pours its waters into the German ocean. The hills of Kinmore and Moncrieff afford extensive propteurs; that from the latter is denominated by Ponnant the "Glory of Scotland." The Tay is navigable as far as Newburgh, in Fifes, for vessels of 500 tons; and vessels of considerable size can go up as far as Perth. The Frith of Tay is not so commodious as that of the Forth; but from the Buttonaves or Barrav lands to Perth (an extent of nearly forty miles), the whole may be considered as a harbour; having the county of Fife on one side, and that of Angus and Perth on the other. There are less great falls of water on the Tay than in most other rivers which rise in a highland district; but it possesses several cascades of considerable height, particularly at the Linn of Camp fare, near its junction with the Illa, where the water is precipitated over a huge bafaltic dike into a pool of great depth.—Beauties of Scotland, vol. iv. Perthshire, 1806. Gazetteer of Scotland, 1806.

Tay, Loch, a lake in Perthshire, Scotland, extends about fifteen miles in length from the village of Killin, its western extremity, to its eastern termination at the village of Kenmore; its breadth is only from one to two miles. Its depth varies in different parts, from fifteen to a hundred fathoms. The banks on both sides are fertile, and finely diversified by the windings of the coasts and the varied appearances of the mountains. On a small promontory near the eastern extremity, are the church and village of Kenmore, near which, on a small islet covered with trees, stand the ruins of a priory, which was dependent on the religious establishment of Scone. It was founded, in 1122, by king Alexander I., who deposited there the remains of his queen Sybilla, the natural daughter of Henry I. of England. On the death of Alexander the priory was more liberally endowed, that the monks might perform masses for the repose of his soul, as well as for that of his queen. The loch abounds with salmon, pike, perch, eels, char, and trout. The salmon are particularly excellent; the fishery for which commences in December, and ends on the 20th of August. The earl of Breadalbane has the exclusive right of fishing there at all feasons. This privilege was originally granted for the purpose of supplying fish for the monks of the priory, and at the dissolution was, with the islet, claimed by this noble family. The waters of this lake have at times suffered violent and unaccountable agitation. An ample account of one of these phenomena, which occurred on Sunday, September 12, 1786, is published in the first volume of the Transactions of the Royal Society of Edinburgh. It was written by Mr. Fleming, late minister of Kenmore. He states, that "about nine o'clock in the morning the water was observed to retire about five yards within the ordinary boundary, and in four or five minutes to flow out again. In this manner it ebbed and flowed successively three or four times within the space of a quarter of an hour, when all at once the water rushed from the eait and west in opposite currents, and rose in the form of a great wave to the height of five feet above the ordinary level, leaving the bottom of the bay dry to the distance of between thirty and an hundred yards from its natural boundary. When the opposite currents met, they made a clashing noise and foamed; and the stronger impulsive being from the eait, the wave, after rising to its greatest height, rolled weard, but slowly diminishing as it went, for the space of five minutes, when it wholly disappeared. As the wave subsided, the water flew back with some force, and exceeded its original boundary four or five yards; then it ebbed again about ten yards, and again returned, and continued to eb and flow in this manner for the space of two hours, the ebings succeeding each other at the distance of about seven minutes, and gradually lessening, till the water settled into its ordinary level. During the whole time that this phenomenon was observed, the weather was calm. It could scarcely be perceived that the direction of the clouds was from north-east." On the 13th of July, 1794, the loch experienced agitations similar to those described by Mr. Fleming, but they were neither so violent nor so long continued.—Beauties of Scotland, vol. iv. Perthshire.

Tay, a river of Ireland, in the county of Waterford, which runs into the sea, 7 miles W.N.W. from Dungarvan bay.

TAYA, a river of Austria, which rises near Schweigers, passes by Drofendorf, and enters Moravia, passes by Znamy, Laab, &c. and joins the March, 4 miles N.N.E. of Hockenau.—Alfo, a small island in the Indian sea, near the west coast of Siam. 'N. lat. 38° E. long. 98° 30'.

TAYADO, a town on the east coast of the island of Celebes, in Gunong-Tellu bay. S. lat. 1° 10'. E. long. 121° 30'.

TAYASAN, a town on the east coast of the island of Negros. N. lat. 10° 18'. E. long. 123° 3'.

TAYBA, a ruined town in the deferts of Syria, which shews in its present state, evident marks of its former magnificence.

TAYECUA, a town of South America, in the province of Darien; 30 miles W. of St. Marie de Darien.

TAYGETA, in Ancient Geography, a river of the Peloponnessus, in Laconia.

TAYGETUS, a mountain of Laconia, S.W. of Bryæes, being a portion of a small chain of mountains on the promontory of Temerus, on the frontiers of Arcadia. It was famous for the abundance of its game. On this mountain was a place consecrated to the Tın, called by Pausanius "Talet." Here they sacrificed, among other victims, horses.

TAYKYATT, a long and straggling town of the Birman empire, on the W. side of the Irrawaddy; 5 miles W.N.W. of Younghen-bah.

TAYL, in Heraldry. See TAIL.

TAYLOR, Brook, LL.D. and F.R.S., in Biography, an eminent mathematician, was born of a good family, at Edinburgh, near London, in the year 1685. In early life he devoted himself to music, drawing, and painting, in which he was reckoned to excel. At the same time he purfued
his classical studies and mathematics under a private tutor; and in 1701, at the age of 15, he was entered a fellow-commoner at St. John's college, in the university of Cambridge. Such was his affinity in the profession of mathematics, that in 1708 he composed his treatise "On the Centre of Oscillation," which was published in the Phil. Trans. In the next year he took his degree of bachelor of laws, and in 1712 he was elected fellow of the Royal Society. By a letter addressed to Mr. Machin, dated in this year, it appears that he had then given a solution of Kepler's famous problem, pointing out its solution and use. He also at the same period presented to the Society three papers, viz. "On the Afection of Water between two Glas Planes?;" "On the Centre of Oscillation;" and "On the Motion of a fringed String." In consideration of his services to the Society, and distinguished qualifications for the office, he was elected their secretary in 1714, taking in the same year his degree of doctor of laws at Cambridge. In 1715, he published his "Methodus Incrementorum," a curious essay, preferred in the Phil. Trans. entitled, "An Account of an Experiment for the Discovery of the Laws of Magnetic Attraction," and also a treatise, of high value and reputation, "On the Principles of Linear Perspective." His correspondence this year with count de Montmort on the tenets of Makebranche was ably conducted, and gained for him an admittance from the French academy; and in 1716, on his visit to Paris, he was treated with great personal respect. Upon his return to London, in 1717, he composed three treatises, published in the 9th volume of the Phil. Trans.; the titles of which are, "An Attempt towards an Improvement of the Method of approximating to the Extraction of Roots of Equations in Numbers," "A Solution of Demoivre's 15th Problem, with the Affidance of Combinations and infinite Series?;" and "A Solution of the Problem of G. G. Leibnitz proposed to the English." His health being impaired by intense application, he was obliged to seek relief at Aix-la-Chapelle. Upon his return, in 1719, he directed his attention to studies very different from those to which he had been accustomed; and the fruits of these studies have been found among his papers by his grandson Sir William Young, in detached fragments of a treatise on the Jewish sacrifices, and a dissertation on the lawfulness of eating blood. His leisure hours were still devoted to the application of mathematics in the improvement of the arts; and with this view he revised his treatise on Linear Perspective, which appeared in a new and enlarged form. Drawing was also a favourite amusement. His treatise on Linear Perspective, which has been held among mathematicians in the highest estimation, produced at this time a controversy, which terminated in a very serious misunderstanding, between him and J. Bernouilli. This treatise, abstruse to those who consulted it for mere practical purposes, was rendered more plain and perspicuous by Mr. Kirby, in an edition, entitled "Brook Taylor's Perspective made easy." Our author's answer to Bernouilli is preserved in the 35th volume of the Phil. Trans. Soon after his return to England in 1721, he published the last paper that appears with his name in the Phil. Trans. entitled "An Experiment made to ascertain the Proportion of Expansion of Liquor in the Thermometer, with regard to the Degree of Heat." Dr. Taylor was twice married: his second wife was a daughter of John Sawbridge, esq. of Olantigh in Kent. On the death of his father, in 1729, he succeeded to the family estate of Bifrons in Kent, and in the following year his wife died in child-bed. About this time he probably wrote the effay, entitled "Contemplatio Philosophica," published by Sir W. Young in 1733. But though his mind might have thus obtained temporary relief, he survived his wife little more than a year, and died of a decline in the 46th year of his age, December 1731. "I am spaired," says his descendant, "the necessity of closing this biographical sketch with a prolix detail of his character, in the best acceptance of duties, relative to each situation of life in which he was engaged; his own writings, and the writings of those who best knew him, prove him to have been the model Christian, gentleman, and scholar." Life by his grandson, Sir William Young, prefixed to his Phllosophical Works.

TAYLOR, JEREMY, an eminent divine and prelate of the Established Church in Ireland, was the son of a barber at Cambridge, where he was born in the early part of the 17th century. At the age of 13 he was admitted at Gonville and Caius college in the university of that place, where he remained till he took the degree of M.A. Having taken orders, he occasionally preached in London, and obtained by the interest of archbishop Laud, in 1636, a fellowship of All Souls' college, Oxford. Here he refuted attempts that were made to provoke him to popery, and became more established in Protestant principles. Laud appointed him one of his chaplains, and procured for him the rectory of Uppington, in which he settled about the year 1649, at which time he surrendered his fellowship and married. In 1642 he was chaplain in ordinary to Charles 1, and served his cause by writing in defence of the church of England. When the parliament became victorious, his living was sequestrated, and he retired into Wales, where he was kindly received by the earl of Carbery, of Golden Grove, near Llandilo, in Carmarthenshire; under whose protection he exercised his ministry, and kept a school for the support of his family. In this state of retirement, he composed those discourses, which caused him to be held in high estimation, as one of the first writers in the English language, "with respect to fertility of conception, eloquence of expression, and comprehensiveness of thought." At this period the death of three hopeful sons disturbed his tranquility, and rendered it necessary for him to change the scene and to remove to London, where he exposed himself to considerable danger by officiating in a private congregation of loyalists. Invited by Edward lord Conway to his seat at Portmore in the county of Antrim, he remained in Ireland until the Restoration. On that event he came over to England, and in January 1660-1, his services were recompened by the promotion to the fees of Down and Connor. He was also made privy-counsellor of Ireland, and appointed to the administration of the bishopric of Dromore, and honoured with the office of vice-chancellor to the university of Dublin. In these high and responsible stations he paid sedulous attention to his official duties, exhibited an example of pious, humble, and charitable; and employed to great a part of his income in doing good, both privately and publicly, that when he died at Lisburne in 1667, he left only moderate portions to his three daughters. His person was comely, his manners were polite, his voice was melodious, and his conversation was agreeable. Of his works, which were numerous, conflicting chiefly of sermons and devotional pieces, and printed in four, and also in five volumes, folio, the most remarkable is entitled, "Theologia Ecclesiaca, or a Discourse on the Liberty of Prophecying; shewing the unreasonable, and of preferring to other men's faith, and the iniquity of persecuting different opinions," 4to. first published in 1647. The author, when this book was written, belonged to a vanquished and persecuted party; and he strongly and boldly pleads for liberty of conscience, and the rights of individuals to judge for themselves in matters of religious.
TAYLOR.

religion. This work, considering the time in which it was written, and the connections of the author, indicates a very enlightened mind with regard to the subjects of discussion; and it is perused with no small degree of interest in the present period of greater knowledge and liberality. With respect to toleration, however, we observe, that he limits it to such doctrines as are not inconsistent with sotticy or the public good;—a limitation which is capable of being much misconstrued and misapplied. Having asserted, as a first principle, that "the duty of faith is completed in believing the articles of the Apostles' creed," he could not consistently approve the imposition of stricter creeds. Of the Athanalian creed he thus speaks: "If I should be questioned concerning the symbol of Athanania, I confess I cannot see that moderate sentence and gentleness of charity in his preface and conclusion, as there was in the Nicene creed. Nothing more but damnation and perishing everlastingly, unless the article of the Trinity he believed, as it is there with curiosity and minute particulars explained. Besides, if it were considered concerning Athanarian's creed, how many people understand it not, how contrary to natural reason it it seems, how little the scripture fayes of those curiosities of explanation, and how tradition was not clear on his side for the article itself, much less for those forms and minutes.—and after all this, that the Nicene creed itself went not farre, neither in article, nor mathematics, nor explanation, it had not been anisite if the final judgment had been left to Jesus Christ."

This celebrated work did not escape invidious criticism and severe amendment. Among others we may mention Anthony Wood, who, with censorious libellousness, suggest that Taylor in this book, and Hales in his tract on Schism, employed their arguments as a stratagem by way of raising factions among the Presbyterians, and diollving their union. The most popular of Taylor's other writings, have been his "Golden Grove, or Manual of daily Prayers;" his treatise on "Holy Living and Dying;" and his "Doctor Dibitantis, or Rule of Conscience." Dr. Dodwell long since observed, and not unjustly, that "Dr. Taylor, in his voluminous writings, said many lively things, which will not bear a strict examination." Biog. Brit. Gen. Biog.

TAYLOR, John, D.D., a learned and highly respectable divine among Protestant Dissenters, was born in the year 1694, at or near Lancaster. After having received his education at Whitehaven under Dr. Dixon and others, he was nominated by one of the Disfree family to the chapel of Kirklees, in Lincolnshire, exempt from ecclesiastical jurisdiction, and which had been occupied from the latter end of the preceding century by dissenting ministers. Here he lived, on a small salary aided by a school, for 18 years; and laid a foundation for the theological celebrity, which he afterwards acquired by a diligent study of the scriptures in their original languages. In this obscurer and retired situation he did not escape notice; and in the year 1733, he complied with an invitation from the Presbyterian congregation at Norwich. To his congregation, which had been before his settlement served by Calvinistic ministers, he recommended the perusal of Dr. Clarke's Scripture-Doctrine of the Trinity. His first publication was "A Prefatory Discourse to Mr. Joseph Rawlin's Cafe," who, in 1736, had been excluded from communion with the congregational church at Nottingham, for refusing his assent to a declaration required of him concerning the Trinity; in which he ably defended the right of Christians to deduce their faith from the scriptures, without the interference of creeds and suppositions. His first avowed attack upon Calvinistic theology, was the publication of his "Scripture-Doctrine of Original Sin," which first appeared in 1740. This excited alarm and animadversion. (For an account of this controversy, see the article Original Sin.) Dr. Taylor's supplement was published in 1744. This was succeeded, in 1745, by "A Paraphrase on the Epistle to the Romans, with a Key to the Apostolic Writings." This "Key" was well received, and has been highly recommended. The late learned Dr. Watfon, bishop of Llandaff, has given it a place in his "Theological Tracts;" and archdeacon Paley recommends a careful perusal of the Paraphrase on the Romans to candidates for priests' orders. The labours of his subsequent years produced several small tracts, and particularly his "Scripture-Doctrine of Atonement;" but hisopus majus, as we may justly denominate it, was his "Hebrew Concordance," in folio, the first volume of which appeared in 1754, and the second in 1757. This work, which does immortal honour to the critical skill and indefatigable industry of the author, was encouraged by a great number of subscribers, among whom we may enumerate twenty-two English, and fifteen Irish bishops. Soon after the publication of this performance, the author was presented by the university of Glasgow with the degree of D.D. In 1754 he published a pamphlet, entitled "The Lord's Supper explained upon Scripture Principles;" and in 1757 appeared a defence of infant baptism, entitled "The Covenant of Grace." Dr. Taylor was happily situated at Norwich, and received every testimony of respect to which his learning and character entitled him; but a scene of more public and general usefulness was opened to him in the year 1757, when he was invited to supply the place of divinity-tutor at the newly-founded academy of Warrington, in Lancashire. But here his situation was rendered unpleasant to him; and some events occurred which affected his health and spirits. Although he performed his official duties for some time amidst the disquiets which he experienced, he was at length carried off, by an unperceived death, during the night of March 5, 1761, at the age of 66 years. At Warrington he published two pamphlets, viz. "An Examination of the Scheme of Morality advanced by Dr. Hucheson, late Professor of Morality in the University of Glasgow," and "A Sketch of Moral Philosophy," for the use of his clafs. He also prepared for the press "The Scripture Account of Prayer, in an Addres to the Diffenters in Lancashire," in consequence of the introduction of a liturgy at Liverpool, an innovation in the accustomed mode of worship among Dissenters which he disapproved. His philosophical work, entitled "A Scheme of Scripture Divinity," was published by Mr. Richard Taylor of Norwich, his eldest surviving son; and it was held in such estimation by the late bishop of Llandaff, as to form a part of his Collection of Texts. As a preacher, Dr. Taylor was plain and simple in his language, but dignified and impressive; and he excelled in a critical explanation of difficult passages of scripture. He had the merit of introducing into the congregation at Norwich a spirit of liberal enquiry, which, we are informed, still continues. Memoir on the Life of Dr. John Taylor of Norwich.

TAYLOR, John, L.L.D., the son of a barber at Shrewsbury, was born about the year 1703, and distinguished himself as a scholar and critic. After a course of preparatory education in his native town, he was entered at St. John's college in Cambridge, and became a fellow of it in the year 1730, in which year he published two Latin academical orations. In 1732 appeared proposals for an edition of Lyra. He was first librarian and afterwards registrar of the university. His "Lyrias," Gr. and Lat., with the conjectures of Markland, was published from the press of Y. Bowyer,
TAYLOR.

Bower, in 1739; and a new edition, with Taylor's version and notes, was printed at Cambridge in the following year. Upon taking his degree of L.L.D. he delivered and published a dissertation under the title of "Commentarius ad legem decemviriatem de inepte debito in partibus discepcando." In 1743, he published "Oraciones dua; una Demothenices contra Mediam; altera Lycurgi contra Leocratem." Gr. and Lat., with notes and emendations; and in the following year, "Marmor Sandvicence, cum Commentario et Notis," being a dissertation on an Athenian marble brought to England by lord Sandwich, bearing the oldest inscription of known date.

In 1741, Dr. Taylor had been admitted an advocate in Doctors' Commons, and in 1744 he was made chancellor of Lincoln. He afterwards took orders, and printed a sermon preached at Bishop-Stortford in 1749. He was precentor of the archdeaconry of Buckinghamshire, to the rectory of Lawford, Essex; and in 1757 to a rectoriaphip of St. Paul's. In 1755, still prosecuting his legal studies, he published "Elements of the Civil Law," 4to. reprinted in 1769. An abridgment of this learned work, entitled "A Summary of the Roman Law," was published in 1773.

Dr. Taylor held also the offices of commissary of Lincoln and of Stowe; he was a member of the Royal and Antiquarian Societies; and of the latter he was one of the vice-presidents. At the time of his death, his long-promised edition of Demosthenes was just finished, in two vols. 8vo. at the university prefs, Cambridge; and the notes were afterwards added, together with part of an appendix to Suidas. The character of Dr. Taylor was that of an amiable and disintered man; and the world was deprived of his learned labours in April 1766. To the works already mentioned, we may add some remarks inferred in Folke's "Essay on Accent and Quantity," and various pieces of poetry, printed in the Gentleman's Magazine, and in Nichols's "Select Collection of Poems." Anecd. of Bowyer. Month. Rev. Gen. Biog.

TAYLOR, Henry, A.M. a very respectable clergyman of the established church, was the son of William Taylor, merchant of London, and born at Southweld, in Essex, in May 1711. The rudiments of his education he received at Mr. Newcome's school, in the parish of Hackney, and there he formed an early friendship with Mr. John Hoadly, son of Dr. Benjamin Hoadly, bishop of Winchelsea. From Hackney he removed to Queen's college, in the university of Cambridge, and having completed his education with a view to the church, he took orders, and commenced the exercise of his ministerial duties as a preacher with singular accept ance. His talents and acquirements, as well as his voice and manner of delivery, which were peculiarly pleasing, recommended him to public notice, and he ranked high in the estimation of those friends with whom he intimately associated. His first precentor was the rectory of Whitchfield, in Oxfordshire, which he held for a minor. In 1755 he was precentor by bishop Hoadly to the rectory of Crawley, in Hampshire, which he afterwards held in connection with the vicarage of Portsmouth, in exchange for a living in Hampshire, which he had held with Whitchfield. He married Miss Christian Fox, daughter of the Rev. Francis Fox, rector of St. Mary's, Rotherhithe, who died in the year 1769; and by her he had four sons and two daughters. His course of literary and clerical labour terminated in April, 1785; and he was interred at Crawley.

Having recited the few particulars which we could collect concerning the private life of Mr. Taylor, we shall now subjoin a list of his publications, some having his name and others being anonymous. In 1760 he published "An Essay on the Beauty of the Divine Economy; being the Substance of a Ser mon (with many and large Additions) preached at the Visi tion of the Lord Bishop of Winchelsea, held by the Worshipful and Reverend Dr. John Hoadly, Chancellor of the Dio cese," on Tuesday September 18, 1759, at the cathedral Church of Winchelsea, and published at the Desire of Mr. Chancellor and the Clergy."—"A Full Answer to a late View of the internal Evidence of the Christian Religion, in a Discourse between a rational Christian and his Friend," 1771.—"A Treat against Warburton," 1772.—"Confusion worse confounded, Rout on Rout; or the Bishop of G——ter's Commentary upon Rice or Arife Evans's Echo from Heaven, examined and expostulated by Indignatio," London, 1772. Anonymous. "Two Letters; viz. 1. A Letter to the Earl of Abingdon, in which His Grace of York's Notions of Civil Liberty are examined by Liberalis, published in the London Evening Poit, November 6, 1777. 2. Vera Icon: or a Vindication of His Grace of York's Sermon, preached on February 21st, 1777; proving it to contain a severe Satire against the Ministry, and a Defence of civil and religious Liberty, upon the well-known Principles of Whigism; in answer to a Letter from Liberalis to the Earl of Abingdon, by Mythagogus Candidus."—"The Apology of Benjamin Ben Mordecai to his Friends, for embracing Christiannity; in seven Letters to Elifha Levi, Merchant of Amsterdam; with Notes and Illustrations, by the Author and the Editor." Lond, 1771. 1772., 1774. 4to. The first of these letters contains an account and examination of the various opinions among Christians, concerning the nature and person of Christ. In the second, third, and fourth letters, it is proposed to shew from scripture, that the Logos was the angel of the covenant, and to prove the fame from the most approved commentators on scripture, both ancient and modern, both Jewish and Christian; and to demonstrate that Jesus was the Messiah. The fifth, sixth, and seventh letters contain preparatory principles to the Christian scheme of redemption; giving the scheme of Christiannity itself, and shewing it to be one, plain, regular, and confluent system of divine economy, from the beginning of the world to the end; and containing proofs, illustrations, answers to objections, and an examination of Mr. Hume's notion of miracles.—"Thoughts on the Nature of the Grand Apology, with Reflections and Observations on the Fiftteenth Chapter of Mr. Gibbon's History of the Decline and Fall of the Roman Empire; to which are added the dissertations: 1. On the Parousia of Christ. 2. On the Millennium. 3. On the late Rev. Mr. Richard Wood, on Prophecy," 1781.—"Further Thoughts on the Nature of the Grand Apology of the Christian Churches, foretold by the Apostles; with Observations on the Laws against Hereby, the Subcription to Articles of Human Composition, and other Subjects of utmost Importance to the Religion of Protestants, and to Christiannity in general," 1783.—"Confederations on Ancient and Modern Creeds compared; the Supremacy of the Father; the persin Existance of the Holy Spirit; the Pre-existence of Christ and his Divinity, &c." published after the author's death by his son, the Rev. Henry Taylor, rector of Sprindlington, Lincolnshire, 1788.

Mr. Taylor, who was of a sprightly, cheerful disposition, occasionally amused himself in writing verses; some of which, particularly his "Paradise Regained," are published in Doddley's Collection.

On Mr. Taylor's principles and character it is needless to enlarge. His conduct in private and social life corresponded to his clerical profession; to the sentiments of bishop Hoadley, in church and state, he was invariably attached; he joined the petitioning
petitioning clergy in their application for an enlargement of the terms of conformity; and he avowed himself on all occasions, without disguise, the friend and advocate of civil and religious liberty. In his theological opinions, he considered himself as coinciding more nearly with Apollinaris, than with any other.

TAY-MING, in Geography, a city of China, of the first rank, in Pe-chi-hi; 232 miles S.S.W. of Peking. N. lat. 56° 20'. E. long. 113° 49'.

TAYING, a town of Corea; 25 miles S.E. of Haimen.

TAYWAN, or Tai-ouan, the capital of Formosa; which fea.

TAZ, a river of Russia, which rises from two lakes, Ku and Din, and runs into the Tazovskia gulf, N. lat. 67° 35'. E. long. 86° 14'.

TAZABUCO, a town of Peru; 46 miles E.N.E. of La Plata.

TAZATA, in Ancient Geography, an island of the Caspian sea, near the coast of Hyrcania. Pliny. It is called Talca by Ptolemy, and Talga by Mela.

TAZEE, in Geography, a town of Candahar; 70 miles E. of Candahar.

TAZEWELL, a poft-town of Tennessee; 517 miles W.S.W. of Washington.

TAZINA, in Ancient Geography, a town of Afia, in Media.

TAZLA, or Salato, in Geography, a lake of Asiatic Turkey, 36 miles long, and 2 broad; 30 miles N. of Cogni.

TAZLA, a town of Asiatic Turkey, in Caramania; 28 miles N. of Cogni.

TAZOVSKIA, a gulf or bay in the Oblica gulf, formed by the waters of several rivers of Siberia, and joined to the Oblica gulf, about 140 miles in length, and 3 in breadth. N. lat. 67° 40' to 69°. E. long. 76° to 86°.

TAZREE, a town of Persia, in the province of Laritan; 15 miles N.E. of Tarem.

TAZUS, TACHELY, in Ancient Geography, a town in the interior of the Tauric Chernofenus, E. of Portacona, mentioned by Ptolemy.—Also, a town of Asiatic Sarmatia, upon the northern coast of the Euxine sea.

TAZZETTA, in Botany, the specific name chosen by Linnaeus, which spells it incorrectly, for the Polyanthus Narcissus. (See Narcissus.) The word is Italian for a small cup, and De'Theirs supposes it was first applied in Italy to this flower, which is much cultivated there, and usually imported from thence, in its highest perfection, by our florists. Still we do not see how Linnaeus came to adopt this name, nor, indeed, how it fell in his way.

TCHA. See Tea.

Tcha, or Cangna, in Geography. See Canga.

TCHABA, a town of Asiatic Turkey, in Natalia; 18 miles E. of Boli.

TCHABAR, a river of Chinefe Tartary, which runs north into the Songarie.

TCHABISCHI, a town of Russia, in the government of Irkutk, on the Amur; 40 miles N.N.E. of Sietrenik.

TCHACAHAMAK, a town of Thibet; 10 miles W. of Orta.

TCHACAO, a town of Thibet; 25 miles S. of Chatcheou.

TCHACO-CHOUTCHI, a town of Thibet; 30 miles N.W. of Tchontori.

TCHACO-TOHOL, a town of Chinefe Tartary, in the country of Hami; 15 miles N.W. of Quatcheou.

TCHADOBSKO, a town of Russia, in the government of Tobolke, on the Tunguska; 212 miles E. of Eniseik.

TCHAGANSKOI, a fortrefs of Russia, on the Ural; 16 miles S. of Uralfik.

TCHAGODO, a town of Russia, in the government of Novgorod, on the lake Voz; 240 miles N.E. of Novgorod. N. lat. 66° 30'. E. long. 38° 44'.—Also, a river of Russia, which rises near Suchotzkoi, in the government of Novgorod, and runs into the Mologa, 16 miles N. of Ufluirzsa.

TCHAHAN HOTA, a town of Chinefe Tartary; 260 miles N. of Peking. N. lat. 43° 58'. E. long. 117° 29'.

TCHAHAN HOMER, a town of Chinefe Tartary; 38 miles S.W. of Couen.

TCHAHAN SOUDBARAN HOTUN, a town of Chinefe Tartary; 161 miles N.N.E. of Peking. N. lat. 41° 38'. E. long. 118° 44'.

TCHAHASOU HOTUN, a town of Chinefe Tartary; 683 miles N.N.E. of Peking. N. lat. 49° 34'. E. long. 127° 42'.

TCHAIL, a town of Persia, in the province of Chorran, or Khorran; 236 miles N. of Herat.

TCHAILA, a river of Russia, which runs into the Lena, near Teshama, in the government of Irkutk. N. lat. 58° 51'. E. long. 109° 34'.

TCHAIKAN, a town of Corea; 28 miles W. of Outehem.

TCHAI-YAM, a river of Russia, which joins the Lo, 15 miles W.S.W. of Pao-king.

TCHAKAN-TOTOHO KIAMEN, a fort of Chinefe Tartary, in the country of the Mongul; 18 miles S.E. of Kara-Hotun.

TCHAKET, a town of Asiatic Turkey, in Aladuleia; 15 miles N. of Adana.

TCHAKTELA, a town of Asiatic Turkey, in Caramania; 27 miles N. of Afskehr.

TCHAL, a town of Kurdistan, or Curtidistan; 28 miles E. of Amadieh.

TCHALBISCHEVO, a town of Russia, in the government of Tobolk; 20 miles S. of Eniseik.

TCHALMOZA, a town of Russia, in the government of Oloetze, on the north-cath coast of lake Onzezkoe; 32 miles S.E. of Povente.

TCHAM, a town of Corea; 420 miles E. of Peking.

TCHAMDOU-SO-TIGAC, a lake of Thibet, about 36 miles in circumference. N. lat. 31° 30'. E. long. 81° 20'.

TCHAMNAGOM-DOU, a lake of Thibet, about 36 miles in circumference. N. lat. 30° 50'. E. long. 92° 54'.

TCHAMSKA, a town of Russia, in the government of Irkutk; 64 miles E.N.E. of Kirenik.

TCHAM-TCHIM HOTUN, a town of Corea; 415 miles E. of Peking. N. lat. 49° 59'. E. long. 124° 40'.

TCHAM-TIEN, a town of Chinefe Tartary; 43 miles N.W. of Sian-ku-leon.

TCHAMTOU, a town of Thibet; 54 miles S.W. of Coacteoufong.

TCHANG, a lake of China, about 20 miles in circumference; 40 miles N.E. of Tchou-techou.

TCHANG-CHAN, or CHAN-CHAN, a small island in the Chinese sea, and most festival of those called Mi-a-tou; 18 miles N.W. of Teyng-techou.

TCHANG-FONG, a town of Corea; 63 miles E.S.E. of King-ki-tao.

TCHANG-HOA, a town of China, of the third rank, in the ilce of Hainan; 42 miles S.W. of Tchen-techou.

TCHANG-INC, a town of Corea; 40 miles S. of Kang.
TCHANG-KIA-KEOU, a gate on the great wall, which separates China from Tartary, in the northern part of Pe-tche-li, the principal passage by which the Tartars enter China; 90 miles N.W. of Peking.

TCHANG-PING, a town of Corea; 15 miles E. of Koang-techou. — Also, a city of China, of the second rank, in Pe-tche-li; 20 miles N.W. of Peking. N. lat. 40° 14'. E. long. 115° 37'.

TCHANG-SING, a town of Corea; 35 miles S. of Koang-techou.

TCHANG-SONG, a town of Corea; 33 miles N.W. of Kang-tcheou.

TCHANG-TCHA, a city of China, of the first rank, in Ho-quang, on the Heng river. The inhabitants of this city have given occasion to a great festival, which is celebrated in the fifth month throughout the empire. The mandarin who governs this city, and was much esteemed and beloved by the people for his probity and virtue, happening to be drowned in the river, they instituted a festival in his honour, which is celebrated by sports, and feasts, and fights upon the waters, as if they intended to search for the mandarin, the object of their love and grief. This festival, which was at first singular to this city, came afterwards to be observed throughout the empire; 742 miles S. of Peking. N. lat. 28° 11'. E. long. 112° 25'.

TCHANG-TCHEOU, a city of China, of the first rank, in Fo-kien; 950 miles S. of Peking. N. lat. 24° 34'. E. long. 117° 34'. — Also, a city of China, of the first rank, in Kiang-nan; 525 miles S.S.W. of Peking. N. lat. 31° 50'. E. long. 119° 29'.

TCHANG-TE, a city of China, of the first rank, in Ho-quang; 717 miles S.S.W. of Peking. N. lat. 29° 22'. E. long. 111° 21'.

TCHANG-YUEN, a town of Corea; 60 miles W.S.W. of Hoang-tcheou. — Also, a town of Corea; 30 miles S.E. of Kang-tcheou.

TCHANG, a lake of Russia, in the government of Koli- van, upwards of 200 miles in circumference; 100 miles W.N.W. of Kolivan.

TCHANKOUR, a town of Thibet; 105 miles S.E. of Sourman.

TCHAN-TE, a city of China, of the first rank, in Ho-nan. This is one of the most northern cities of the province. Two things are here remarkable: the first is a fish resembling a crocodile, the fat of which is of such a singular nature, that when once kindled it cannot be extinguished; the second is a mountain in the neighbourhood, so steep and inaccessible, that in time of war, it affords a place of refuge to the inhabitants, and a safe asylum from the infidels and violence of the foildiers. Tchan-te contains in its district one city of the second class, and six of the third; 255 miles S.S.W. of Peking. N. lat. 36° 0'. E. long. 114°.

TCHAO-KING, a city of China, of the first rank, in Quang-tong, on the river Si; 1562 miles S.S.W. of Peking. N. lat. 23° 3'. E. long. 111° 44'.

TCHAO-NAIMAN-SOUMI-HOTUN, a town of Chinefe Tartary; 198 miles N. of Peking. N. lat. 42° 28'. E. long. 115° 44'.

TCHAO-TCHEOU, a city of China, of the first rank, in Quang-tong, on the Pe-kiang; 1507 miles S. of Peking. N. lat. 23° 37'. E. long. 116° 21'.

TCHAO-TCHIANG, a town of Thibet, about 54 miles in circumference. N. lat. 32° 12'. E. long. 84° 34'.

TCHARKAZ. See Zarchas.

TCHARONDA, a town of Russia, in the government of Novgorod, on the Sula; 188 miles E.N.E. of Novgorod. N. lat. 59° 20'. E. long. 57° 34'.

TCHASIRCONG, a town of Thibet, near the Ganges; 24 miles E. of Latac.

TCHASTIJA, an island of Russia, in the government of Irkutfs, on the Lena; 112 miles N.E. of Kirensk.

TCHAT, a mountain of Thibet, on the frontiers of Yarkan. N. lat. 33° 10'. E. long. 78° 44'.

TCHATELI, a town of Chinese Tartary, in the country of Hami; 38 miles N.W. of Hami-Hotun.

TCHAUNSALIA, a gulf on the northern coast of Russia, in the Frozen sea. N. lat. 71° to 72°. E. long. 166° to 169°.

TCHASI, a town of Russia, in the government of Mogilev, on the Sos; 40 miles S.E. of Mogilev. N. lat. 53° 36'. E. long. 31° 14'.

TCHAZMIUSKII, a cape on the coast east of Kamtchachka; 52 miles S. of Vercheni Kamtschatkii. N. lat. 55° 48'. E. long. 160° 15'.

TCHEBAKSAR, a town of Russia, in the government of Kazan, on the Volga; 64 miles W.N.W. of Kazan. N. lat. 56° 24'. E. long. 46° 30'.

TCHEBAULSKAIA, a fortress of Russia, in the government of Upha; 132 miles E. of Upha.

TCHECHIY, a river of Russia, which runs into the Lena, nearly opposite Ilinskii.

TCHECO, a town of Thibet; 93 miles E.S.E. of Laffa.

TCHEFTKAN, a town of Asiatic Turkey, in Aladula; 45 miles N.W. of Adana.

TCHEGEN, an island in the Caspian sea; 144 miles S. of Afrachan.

TCHEGOTCHINA, a river of Russia, which runs into the Kolima, N. lat. 68°. E. long. 150° 14'.

TCHEGUEDE HOTUN, a town of Chinefe Tartary, on the east bank of the Amur, opposite Teldom; 673 miles N.N.E. of Peking. N. lat. 49° 26'. E. long. 127° 37'.

TCHHEARSHEB, a town of Asiatic Turkey, in Natalia; 30 miles S.E. of Dabul Shehr.

TCHOKENAG, a town of Asiatic Turkey, in Caramania; 21 miles S. of Kirchehr.

TCHHE-KIANG, a province of China, bounded on the north and north-west by Kiang-nan, on the east by the sea, on the south by Fokien, and on the south-west by Kiang-si; about 200 miles in length from north to south, and from 120 to 180 broad. This province, which was formerly the residence of some of the emperors, is one of the most considerable in the empire, on account of its maritime situation, extent, riches, and the number of its inhabitants. The air is pure and healthful; the plains are watered by a number of rivers and canals, kept in good order; and the springs and lakes, with which it abounds, contribute greatly to its fertility. The natives are mild and lively, and very polite to strangers; but they are said to be extremely superstitious. A prodigious quantity of silk-worms is bred in this province; whole plains may be seen covered with dwarf mulberry-trees, which are purposely checked in their growth: they are planted and pruned almost in the same manner as vines. Long experience has taught the Chinefe, that the leaves of the smallest trees procure the best silks. The principal branch, therefore, of the trade of this province, consists in silk-rafts; those in which gold and silver are intermixed are the most beautiful, and most esteemed in the empire. With regard to their common pieces, an immense quantity is sent to every part of China, to Japan, the Philippines, and to Europe;
Europe; and, notwithstanding this exportation, so much is left, that a complete suit of silk may be bought here as cheap as one of the coarsest woolen-cloth in France. Excellent hemp is brought from this province, and those small gold fish with which ponds are commonly flocked. The tallow-tree grows here, and a species of mushrooms, which are transported to every province of the empire. In Tche-kiang there are reckoned to be 71 cities of the first class, 72 of the third, and 18 fortresses, which in Europe would be accounted large cities. (Grotier's China, vol. i. p. 64.)

According to Mr. George Staunton, the number of inhabitants amounts to 21 millions, and the province includes 39,150 square miles, or 25,656,000 acres. See China.

TCHELAO, a town of Persia, in the province of Chafa or Khorassan: near it is a narrow defile in a mountain, called, by the orientalists, Hell, from the difficulty of the passage.

TCHELBOSCH, a river of Russia, which joins the Biyoga, and runs with it into the sea of Azof; 40 miles S.W. of Eifko.

TCELEH-DAGHI, a mountain of Natolia, N.E. of Boli.

TCELGA, a town of Abyssinia; 20 miles N.W. of Gondar. N. lat. 12° 44'. E. long. 37° 18'.

TCELABINSK, a town of Russia, in the government of Upha; 188 miles E. of Upha. N. lat. 54° 50'. E. long. 62° 4'.

TCELMINAR, or Tcheulinar. See Chilminar.

TCHEMURTAESKOI, in Geography, a fortress of Russia, in the government of Iukut; 60 miles S.W. of Selingirsk.

TCHEN, a town of Corea; 13 miles N.E. of Ping-hai.—Also, a city of China, of the second rank, in Ho-nan; 416 miles S.W. of Peking. N. lat. 34° 46'. E. long. 110° 36'.—Also, a city of China, of the second rank, in the island of Hai-nan; 57 miles S.W. of Kiong-techeou. N. lat. 19° 52'. E. long. 108° 40'.

TCHEN-AN, a town of Corea; 35 miles S.S.E. of Heifein.

TCHENBAR, a town of Russia, in the government of Penza; 80 miles W.S.W. of Penza. N. lat 52° 52'. E. long. 43° 30'.

TCHENDEL, a river of Russia, which runs into the Yana, near its mouth.

TCHENE, a town of Egypt, on the right bank of the Nile; 18 miles N. of Asyneh.

TCHENG-TCHANG, a town of Corea; 30 miles S.S.E. of Haimen.

TCHENG-TE, an island in the Eastern sea, near the south coast of Corea; about 10 miles long, and 6 broad. N. lat. 34° 20'. E. long. 128° 37'.

TCHEN-HAI, a town of Corea; 30 miles S. of Tintseou.

TCHENJE, See H.EMUS.

TCEOU-CHAN, or CHU-SAN, an island in the Chinese sea, near the west coast of China, belonging to the province of Tche-kiang, about 24 miles long, and from 4 to 10 broad.

TCEPAGIRSKOI, a town of Russia, on the Podkamonskaia Tunguulka. N. lat. 61° 20'. E. long. 96° 44'.

TCEPETKINA, a river of Russia, which runs into the Kolina, 88 miles N. of Verchni Kovunskoi. N. lat. 68° 53'. E. long. 148° 14'.

TCHER, a river of Russia, which runs into the Don, near Tcherkowskaia, in the country of the Cozacks.

TCHERDAKLI, a town of Russia, in the government of Ekaterinoslav; 32 miles N. of Mariupol.

TCHEREDOVA, a town of Russia, in the government of Tobolsk, on the Irtisch; 16 miles N. of Tara.

TCHEREMISSES and TCHEREMISSES, tribes of people occupying the vicinity of the Volga, in the government of Regen. These people use the horse in their facrifices, and chiefly white ones, especially in their great annual solemnities in autumn, of which none can partake, unless he has first bathed and put on a clean shirt.

TCHEREMISCHECK, a river of Russia, which runs into the Volga, near Singilev, in the government of Simbirsk.

TCHEREPOVETZ, a town of Russia, in the government of Novgorod, on the Salia; 188 miles E.N.E. of Novgorod. N. lat. 59° 40'. E. long. 37° 34'.

TCHERPOMENA, a sequestered beautiful valley of the Crimea, inhabited by the richexels Tartars, who, from their vicinity to Aktiar, find a ready market for the produce of their lands; carrying thither honey, wax, fruit, and corn. This valley is described as the retreat of health and joy; the pipe and tabor sounding merrily among mountains, thick set with groves, which clothe them on every side. The performers consist of parties of Tzigankies, or gipsies, who, as mendicant artists, musicians, and astrologers, are very common all over the south of Russia. They have also a wind-influenced reeling a haut-boy, made of the wood of cherry-tree, and they carry with them the large Tartar drum, characteristic of the Cimbri in the time of Strabo. These gipsies are much encouraged by the Tartars, who allow them to encamp among their villages and to exert their various occupations. Many of them are rich, polishing fine horses and plenty of other cattle; but rich or poor, their mode of life is the same.

TCHERIKOV, a town of Russia, in the government of Mogilev, on the Soz; 80 miles S. of Mogilev. N. lat. 52° 36'. E. long. 30° 54'.

TCHERKASK, a town of Russia, in the country of the Cozacks, on the Don. The appearance of the town, viewed from the river, affords a most novel spectacle. Although not so grand as Venice, it somewhat resembles that city. The entrance to it is by broad canals, intersecting it in all parts. On each side, wooden houses, built on piles, appear to float upon the water: to these the inhabitants pass in boats, or by narrow bridges only two planks wide, with poles and rafts, forming a caufeway to every quarter of the town.

The town of Tcherkask is divided into eleven villages, and contains 15,000 inhabitants, occupying about 3000 houses, and allowing, upon an average, five persons to each house. Here are seven churches, four built of stone and three of wood. One of these churches is appropriated to the Mahometan worship of the Tartars. The fortified in this place was founded by Peter the Great, and in this they keep what they call their regalia, applying the term to republican, rather than to regal, ensigns of distinction. Another church is built in the Greek style, with fourteen Corinthian columns, covered entirely with burnished gold. Almost all the other public edifices are constructed of wood. Here are fix prisons, four for males and two for females; and the prisoners are allowed to go about begging in their chains. The shops are very numerous, kept chiefly by Greeks, and containing the produce of Turkey, as pearls, cloth, flaxens, tobacco, fruit, &c. Here are two public baths, and each village has its respective tavern. The inhabitants, according to Dr. Clarke in his Travels (vol. i.), are cleanly in their appearance, polished in their manners, well instructed, hospitable, generous, and disinterested, humane to the poor, good husbands, good wives,

TCHERKASSES, or TCHERKASSIANS, a tribe of people, who inhabit that part of Caucasus which is called the Great and Little Kuhardia, the islands of the lower Kuban, and the southern bank of that river. (See CIRCASSIA.) These people are famous for their horses, which are about the size of the Kalmuck horse, ill-made, without elegance or proportion, and for the most part eare-necked, but of such strong and hardy natures, as to be able to run five or six hundred English miles in three days.

TCHERKESH, a town of Asiatic Turkey, in Natalia; 45 miles W.S.W. of Camtana.

TCHERKIN, a town of Abyssinia; 36 miles N. of Gondar. N. lat. 14° 15'. E. long. 57° 40'.

TCHERMAEVSKII, a town of Russian, in the government of Tovolok; 32 miles E.N.E. of Turinik.

TCHERNALAA, a river of Russia, which runs into the Anadir, 100 miles below Anadirkoii.

TCHERNAIAGRIADA, a fortresses of Russia, on the Volga; 72 miles N.W. of Astrachan.

TCHERNIGOV, a town of Russia, and capital of the government, on the Densa; 344 miles S.S.W. of Moscow. N. lat. 51° 24'. E. long. 31° 14'.

TCHERNIGOVSKOE, a town of Russia, bounded on the N. by Mogilevskoe, on the N.W. by Novgorod Sieverkoe, on the E. by Charkovskoe, and on the S. by Kievskoe, and on the W. by Polaud: about 180 miles long and 40 bread. N. lat. 49° 50' to 51° 5'. E. long. 31° to 33°.

TCHERNIKEH, a town of Asiatic Turkey, in the government of Sivas, at the union of the Tofanu and Jekil-Ermak; ancidity a city of Pontus, and called Eupatoria, from Mithridates, furnamed Eupator; 24 miles N. of Amatia. N. lat. 46° 26'. E. long. 36° 30'.

TCHERTNITZ. See Czernitz.

TCHERNOYAR, a town of Russia, in the government of Saratow, defended by a ditch and chevaux-de-frize, with some cannon; 200 miles N.W. of Astrachan. N. lat. 47° 54'. E. long. 46° 4'.

TCHERNOLOTZKAI, a town of Russia, in the government of Toholok; 20 miles W. of Omlok.

TCHERNOMORSKI, or Cossacks of the Black Sea, a tribe of Cossacks, whose territory is separated by the river Ae or Tch, from that of the Grecian or Malo-Russian inhabitants, whose number does not exceed 700 persons, and the boundary of whose district is formed by the river Ae towards the S. and by the sea of Azof to the N. The Tchernomorski are a brave but rude and warlike people, and hospitable to strangers. Their original appellation was Zaporozi or Zaporians, denoting their former situation "beyond the cataracts" of the Dnieper. From the banks of this river they were removed by the late emperors Catherine to those of the Kuban, in order to repel the incursions of the Circassians and Tartars from the Turkish frontier. In consequence of the service they rendered to Russia in Catherine's last war with Turkey, the emperors, by an ukase of the 2d of June, 1792, ceded to them the peninsula of Taman, and all the countries between the Kuban and the sea of Azof, as far as the rivers Ae and Laba; an extent of territory comprehending upwards of 1000 square miles. They had also a constitution allotted to them in all respects similar to that of the Don Cossacks, and received the appellation of "Cossacks of the Black sea." They were also allowed the privilege of choosing an Ataman; but their numbers have been considerably diminished. They could once bring into the field an army of 40,000 effective cavalry; but at present, their number of troops does not exceed 12,000. They now occupy the whole country from the Ae to the Kuban, and from the Black sea to the frontier of the Don Cossacks. (See Cossacks.) The Tchernomorskii do not resemble the Cossacks of the Don in habits, disposition, or any other characteristic quality. The latter wear the true uniform; the former wear any habit according to their caprice. The Don Cossack is mild, affable, and polite; the Black-see Cossack is blunt and even rude, from the boldness and martial hardiness of his manners. If he is poor, he appears clad like a primeval shepherd, or the wildest mountaineer; at the same time having his head bald, except one long braided lock from the crown, placed behind the right ear. This lock distinguishes the Tchernomorski Cossack from the Cossack of the Don, as well as from every other tribe of Cossacks in the Russian empire. If the Euxine Cossack is rich, he is very lavish in the costliness of his drapery, which consists of embroidered velvet, and the richest filks and cloths of every variety of colour. The Tchernomorski are more cheerful and noisy than the Don Cossacks; turbulent in their mirth; vehement in conversation; somewhat querulous; and if not engaged in dispute, they are generally laughing or singing. Both these Cossacks hold one another in low estimation. The metropolis of the Tchernomorski Cossacks is "Ekaterinedara," or "Catherine's Gift." It has no resemblance to a town; but is rather a grove, or forest of oaks, in which a number of straggling cottages, widely separated, are concealed, not only from general observation, but from the view of each other. The country is covered with tumuli, which are very ancient, and appear by their remains to have been sepultures. The government is wholly exercised by the Ataman and his officers, who wear theatrical and splendid habits. Their breasts are covered with chains of gold and goldlace; their fabre is Turkifh; their boots of red or yellow-coloured leather; their caps of black velvet, ornamented with lace and silver chains; or fine black Tartarian wool, taken from lambs in an embryo state. They bind their wait with filken fashes, sustaining pistols of the most costly workmanship. A small whip, with a short leathern thong, is attached to their little finger. The lower extremity of their lance is supported by the right foot; and from the powder-flasks, pendent in front, are suspended silver coins, and other trinkets. The Circassians and Tchernomorski carry on trade by a peculiar kind of barter. The exchange of corn, honey, mats, wood, and arms, for the salt of the Cossacks, is transacted without contract; the wares of the Circassians being placed on the ground where they find the salt ready stationed for barter. The Tchernomorski who are employed in guarding their cattle in the steppes, amounting to many thousands, from the depreda- tions of the Circassians, pass the nights upon the bare ground; and in order to protect themselves from the mosquitoes, which are both numerous and troublesome, creep into a kind of sack, sufficient only for the covering of a single person; beneath this they lie upon the thistles and other wild plants of the steppes. In order to avoid the excessive irritation and painful swelling occasioned by the stings of these fe- rocious insects, they light a number of fires to drive them from the cattle during the night; but their thirst of blood is so intractable, that swarms will attack a person attempting to shelter himself even in the midst of smoke. See Clarke's Travels, vol. ii. 8vo.
TCHERPLINSKOI, a fortress of Russia, in the government of Upsha on the Ural; 124 miles E. of Orenburg.

TCHERTCHI, a town of Thibet; 20 miles S.W. of Harachar.

TCHERTOVSKA, a town of Russia, in the government of Irmuk; 32 miles S.W. of Kirenik.

TCHERVELNA, a fortress of Russia, in the government of Caucaus, on the Maika; 64 miles E. of Ekaterringrad.

TCHESKAI A, a gulf or bay in the Frozen ocean, on the N. coast of Russia. N. lat. 66° 50' to 77° 40'. E. long. 45° to 47°.

TCHESUCHINSKOI, a fortress of Russia, on the borders of China; 104 miles S.W. of Nertchinsk.

TCHET-TAN, a river of China, which runs into the Tom, 12 miles W. of Yeou.

TCHET-CHEOU HOTUN, a town of Chinese Tartary, in the country of Hami; 983 miles E. of Peking. N. lat. 40° 29'. E. long. 94° 21'.

TCHETTIRDAUGH, a mountain of the Crimea, the Trepaeus of Strabo, the height of which Pallas flates to be about 1200 feet, and Dr. Clarke says, that it does not exceed 1300 feet; though the rapidity of its rise from the coast about Alulta makes its elevation appear to be much greater. Almost the whole of the Crimea may be seen from its summit in clear weather. The higher parts of this mountain exhibit a mass of lime-flone, very compact and of a grey colour. Its ancient name, Trepaeus, was probably derived from the table-form of its summit. The lower district is covered by groves impenetrable to the rays of the sun.

TCHEUISKOI, a town of Russia, in the government of Tobolsk, on the Ob; 48 miles N.N.E. of Kolvian.

TCHETVTA, a river of Russia, which runs into the Vitaka, near Slobodkoi, in the government of Vitaka.

TCHIATAM, a town of Thibet; 510 miles E. of Laffa. N. lat. 28° 3'. E. long. 99° 20'.

TCHICOU, a town of Corea; 18 miles S.S.E. of Long Kounang.

TCHICSE, a town of Thibet; 12 miles E. of Ilatce.

TCHICTAMTA, a town of Thibet; 15 miles N.E. of Piet-chan.

TCHIEIN, a town of Russia, near the flails which separate the continent of Asia from America. N. lat. 65° 40'. E. long. 188° 24'.

TCHIGLING, a river of North America, which runs into the Frozen sea, opposite to the island of Chichilt.

TCHIKIRI, a river of Chinese Tartary, which runs into the Amur, 15 miles N. of Saghaliin Oula Hotun.

TCHILINSKOI, a town of Russia, in the government of Irmuk, on the Ingoda; 60 miles E. of Droninik.

TCHILLDIR MOUNTAINS, a name which is given to a very high ridge, formed by some branches of mount Caucaus, which taking an opposite direction of those known by the name of the "Mountains of Ceranium," pafs towards the S. and S.W., crofs Ahgaz and Mingrelia, and encircle the Euxine to the E. and S.E. These unite in the above-named high ridge on the northern frontier of Immertica, and again open into the Turkish province of Akiha. Here they affume the appellation of Tchildir, and would appear to separate into three branches, the moat northern of which follows in a S.E. line the banks of the Cyrus, and ultimately produces an immense range, which running parallel with the Caphar, separates Irak from Ghibia and Mazanderan, and to the N. of Mehid is lost in the deferts of Vol. XXXV.

Khorassan. In the neighbourhood of Sultanee and Cazween this range receives the name of Khai Caucafan, and in the vicinity of Tehraun it is called Elbourz. The middle ridge of the Tchildir mountains, under the denomination of the Moffan hills, traverses the province of Georgia, and bounds on the N. the delightful plain of Erivan. It then enters the Russian districts of the Karabaug and Karadauge, and gradually sinks into the plains of Mogau. The last and most southern branch of the Tchildir mountains, bending to the S. and E., pafs the town of Karas, and forms a junction with mount Taurus. Kinneir's Mem. of the Persian Empire.

TCHINDAT TURUKUEVSKOI, a fort of Russia, in the government of Irmuk; 72 miles S. of Nertchinsk.

TCHINDAT TURUKUEVSKOY, a fortress of Russia, in the government of Irmuk; 80 miles S.W. of Nertchinsk.

TCHINEH, a town of Asiatic Turkey, in Natolia; 15 miles W.N.W. of Moglah.

TCHING, a city of China, of the second rank, in Hoonan; 382 miles S. of Peking, N. lat. 33° 49'. E. long. 141° 38'. Allo, a city of China, of the second rank, in Hoonan; 340 miles S.S.W. of Peking. N. lat. 34° 50'. E. long. 113° 29'.

TCHI-NGAM, a city of China, of the second rank, in Se-cheu-chen; 780 miles S.W. of Peking. N. lat. 28° 32'. E. long. 107° 4'.

TCHING-CANG, a city of China, of the second rank, in Yunnan; 1302 miles S.W. of Peking. N. lat. 24° 12'. E. long. 99° 16'.

TCHING-CHAN, a town of Corea; 30 miles S.S.E. of Ou-teacher.

TCHING-HE, a town of Corea; 30 miles N.N.E. of Kang-teacher.

TCHING-HIANG, a city of China, of the first rank, in Se-cheu-chen; 910 miles S.W. of Peking. N. lat. 25° 18'. E. long. 104° 26'.

TCHING-KIANG, a city of China, of the first rank, in Kiang-nan, on the south side of the river Yang-tfe. This is not one of the largest cities of the province, for it is not above a league in circumference, and has authority over only three cities of the third class, but it is one of the most considerable for its situation and commerce; it is the key of the empire towards the sea, and is also a fortress, where there is also a strong garrison; the walls are above 30 feet in height in several places. The streets of the city and suburbs are paved with marble; 470 miles S.S.E. of Peking. N. lat. 31° 14'. E. long. 118° 55'. Allo, a city of China, of the first rank, in Yunnan; 1082 miles S.S.W. of Peking. N. lat. 24° 44'. E. long. 102° 40'.

TCHING-NING, a city of China, of the second rank, in Koee-teacher; 1017 miles S.W. of Peking. N. lat. 26° 5'. E. long. 105° 1'.

TCHING-TCHEOU, a city of China, of the first rank, in Hou-quang. This city is situated on an angle made by two rivers; the country is watered by a great number of brooks, which make the valleys exceeding fruitful; it is very full of mountains, which yield plenty of quick-silver, lapis lazuli, and green-stones for painting. There are also mines of silver and gold. The people who inhabit the mountains are not so polite as the rest of the Chinese; on the contrary, their rude and savage manners make them to be looked upon as barbarians. The district of this city contains one of the second order, and nine of the third; 765 miles S.S.W. of Peking. N. lat. 28° 23'. E. long. 109° 40'. Allo, a city of the province of Kiang-nan, situated near the canal through which all barks going from Zou-
Sou-tcheou to Kiang must pass. It is celebrated on account of its trade, and water which gives tea a pleasant taste; dependent on it are five cities of the third class, in which a particular kind of earthen-ware is manufactured, highly valued by the Chinefe, and preferred to the most elegant porceain.

TCHING-TEOU, a town of Corea; 30 miles S.S.W. of Kang-tchoeu.

TCHING-TING, a city of China, of the firft rank, in Pe-tcheou. Tching-ting is a large city, about four miles in circumference. Its jurifdiction is very extenfive, and comprehends 32 towns; five of which are of the second, and 27 of the third class. Northward from it lie several mountains, where the Chinefe fay many simples and curious plants are to be found; on these mountains there are alfo many monuments or temples, erected in honour of deceased heroes; among which is one consecrated to the memory of the firft emperor of the dynasty of Han; 137 miles S.S.W. of Peking. N. lat. 39° 9'. E. long. 114° 20'.

TCHING-TOU, a city of China, of the firft rank, in Se-tcheou. This was formerly the residence of the emperors, and one of the largest and moft beautiful cities in China; but in 1646, it was almost entirely destroyed, during the civil wars which preceded the laft invasion by the Tartars. Its temples, bridges, and the ruins of ancient palaces, are objects of admiration to strangers; neither its commerce, nor the manners of its inhabitants, have any thing to diftinguish it from other cities, nor its situation, which is, however, exceedingly pleasant. It has under its jurifdiction six cities of the second class and 25 of the third; 810 miles S.S.W. of Peking. N. lat. 50° 40'. E. long. 103° 44'.

TCHING-HOÁ, a town of Corea; 50 miles E.N.E. of King-ki-tao.

TCHINKITANY BAY, a bay on the W. coast of North America, called by the Spaniards Baya de Guadalupe.

TCHING-NAN, a city of China, of the second rank, in Yun-nan; 1187 miles S.W. of Peking. N. lat. 25° 16'. E. long. 101° 4'.

TCHING-NGAN, a city of China, of the firft rank, in Quang-ki; 1150 miles S.W. of Peking. N. lat. 23° 21'. E. long. 106°.

TCHING-YUEN, a city of China, of the firft rank, in Quang-ki; 1145 miles S.W. of Peking. N. lat. 23° 14'. E. long. 106° 30'.

TCHIRAKI, a town of Chinefe Tartary, in the country of the Kalkas. N. lat. 48° 36'. E. long. 115° 16'.

TCHIRKOUTAN, one of the small Kurile iflands. N. lat. 49° 20'. E. long. 153° 4'.

TCHRINOOL, one of the small Kurile iflands. N. lat. 45° 8'. E. long. 151° 50'.

TCHIRON. See SHIRON.

TCHISEGI DACHI, a mountain of Asiatic Turkey, in the government of Sivas, near Divriki.

TCHISTAY, a town of Bohemia, in the circle of Boleslaw; 6 miles N.W. of Jung Buntzel.

TCHISTIAKOVA, a town of Russia, in the government of Perm; 36 miles N. of Perm.

TCHISTOKOLS, a town of Russia, in the government of Kazan; 35 miles S.E. of Kazan. N. lat. 50° 16'. E. long. 49° 54'.

TCHI-TCHEOU, a city of China, of the firft rank, in Kiang-nan; 570 miles S. of Peking. N. lat. 30° 45'. E. long. 117°.

TCHI-TCHOUAN, a town of Thibet; 20 miles N. of Chao-ma-ang Hotun.

TCHIUNA, a river of Russia, which rifes six miles from Braitkoi, in the government of Kollvan, lat. 56° long. 101°, and runs into the Tungulka, 56 miles S.E. of Enifeik. N. lat. 57° 54'. E. long. 93° 34'.

TCHIURAC, a river of Natolia, which runs into the Meinder near Telecharthebe.

TCHIUYEN, a town of Corea; 15 miles S.E. of Tchin-tchoeu.—Alfo, a city of China, of the firft rank, in Koei-tchoeu; 1000 miles S.S.W. of Peking. N. lat. 27° 11'. E. long. 107° 51'.

TCHO, a city of China, of the second rank, in Chan-fi, on the river Fuen; 293 miles S.W. of Peking. N. lat. 36° 30'. E. long. 111° 23'.

TCHOCOU, a town of Thibet; 18 miles E. of Harach Hotun.

TCHOHA KIAMEN, a poft of Chinefe Tartary; 45 miles S.W. of Kara.

TCHOL. See PALCATI Nor.

TCHOKA. See SAGHALIEN.

TCHOL, a river of Chinefe Tartary, which rifes in lat. 48° 20', long. 120° 34', and runs into the Noupi, N. lat. 46° 28'. E. long. 123° 31'.

TCHOL Hotun, a town of Chinefe Tartary, on a river of the fame name; 500 miles N.N.E. of Peking. N. lat. 46° 41'. E. long. 123° 35'.

TCHOL-ABADI, a town of Asiatic Turkey, in Caucasian; 32 miles S.W. of Almkheer.

TCHOM-CONCHO, a town of Chinefe Tartary; 25 miles S.W. of Ning-yuen.

TCHOM-YUEN, a town of Chinefe Tartary; 15 miles N. of Gecho.

TCHONG, a town of Corea; 68 miles from Kin-naitehan.—Alfo, a city of China, of the second rank, in Quang-ki; 1175 miles W. of Peking. N. lat. 22° 26'. E. long. 107° 4'.

TCHONG-HOTOC, a town of Thibet; 90 miles S.S.W. of Horatoubé.

TCHONG-KIANG-CHE, a town on the W. coast of Formofa. N. lat. 24° 40'. E. long. 138° 2'.

TCHONG-KING, a city of China, of the firft rank, in Se-tchuen. This is one of the moft commercial cities of the province. It is in a great measure indebted for its trade to its situation at the confluence of two remarkable rivers; one of which, called Han-chou-kiang, or Golden-fand, receives in its course all the streams from the mountains, which rife on the neighbouring confines of Tartary. The other is Ta-kiang, which has its fource beyond the boundaries of China, and is commonly called Tang-jje-kiang. Tchong-king is built upon a mountain, and rifes in the form of an amphitheatre; the air round it is wholesome and temperate. This city is celebrated for its filk, and a particular kind of trunks, made with canes, interwoven in the manner of basket-work. It has in its dictrict three cities of the second class, and eleven of the third; 750 miles S.W. of Peking. N. lat. 29° 42'. E. long. 106° 19'.

TCHONG-KOUE, or the Middle Kingdom, the name which the Chinefe give to this empire; the western Moguls call it Catay; the Mantchew Tartars, Nica-courou; the Japanefe, Thau; and the people of Cochinchina and Siun, Cin, from which last appellation that of China is probably derived.

TCHONTORI, a town of Thibet; 175 miles S.E. of Hami. N. lat. 46° 24'. E. long. 96° 34'.

TCHORRO-TOHON-KIAMEN, a poft of Chinefe Tartary; 23 miles N. of Odoli.
between the Russians and Chinese, it was agreed that it
should be demolished, that no cause of umbrage or complaint
might be left to the Tartar hunters.

The Tagouris, who appear to be the oldest inhabitants of
the country, are tall, strong of body, and acculturated to
labour; they build themselves houles, sow corn, and cul-
tivate their lands, although they have always been surrounded
by Tartars who live under tents, and are entirely ignorant of
agriculture.
The Saxon Tartars are still more robust, braver, and of
greater ingenuity; they are almost all hunters; their women
mount on horsecback, handle the bow and the javelin, and
follow in the chase flags and other wild animals. It is
generally about the beginning of October that these Tartars
depart to hunt fables, clad in a short close garment of wolf’s
skin: they cover their heads with a cap made of the same,
and carry their bows suspended at their backs.

They take along with them several horses loaded with
facks of millet, and their long cloaks made of foxes’ or
tygers’ skins, which they wrap round them to defend them-
selves from the cold, especially during the night. Their
dogs are trained to this kind of hunting; they are accus-
tomed to climb the steepest rocks, and know all the strata-
gems of the fables.
The fables’ skins of this country are highly valued. Some
of the rivers that run into the Saghalien-oula furnish pearls;
123° 30’.
T. E., a city of China, of the second rank, in Chon-tong,
on the grand canal: 150 miles S. of Peking. N. lat. 37° 35’.
E. long. 115° 50’.

TEA-TREE, in Botany. See TEA.

TEA, in common language, denotes the leaves of the tea-
tree, as they are imported into this country, and the infusion
of them in boiling water. The term is more extensively
applied to any other infusion of ordinary roots or herbs.

Dr. Lettton, in his botanical description of the tea-plant,
thinks it most probable, that there is only one species, and
that the difference between the green and bohea teas depends
on the nature of the soil, culture, age, and the manner of
drying the leaves. He adds, that it has even been observed,
that a green tea-tree, planted in the bohea tea country, will pro-
duce bohea, and on the contrary; and that on his examining
several hundred flowers, brought both from the bohea and
green tea countries, their botanical characters have always
appeared uniform. We are principally indebted to Kempter,
Le Compte, and Du Halde, for an authentic history of the
culture of this exotic shrub, and the manner of preparing or
curing its leaves.

The particulars of greatest importance that have been
recited, have lately been judiciously collected, and the sub-
ject further illustrated by additional observations by Dr.
Lettton.

The tea-tree loves to grow in vallies, at the foot of moun-
tains, and upon the banks of rivers, where it enjoys a southern
exposure to the sun; though it endures considerable vari-
atations of heat and cold, as it flourishes in the northern clime
of Peking, as well as about Canton; and it is observed that
the degree of cold at Peking is as severe in winter as in some
of the northern parts of Europe. However, the best tea
grows in a mild temperate climate, the country about Nan-
kking producing better tea than either Peking or Canton,
between which places it is situated.

The root resembles that of the peach-tree; the leaves are
green, longish at the point, and pretty narrow, an inch and
half long, and jagged all round. The flower is much like
that of the wild rose, but smaller. The fruit is of different
forms, sometimes round, sometimes long, sometimes triangu-
lar, and of the ordinary size of a bean, containing two or
three seeds, of a mouse-colour, including each a kernel.
These are the seeds by which the plant is propagated: a
number from fix to twelve or fifteen being promiscuously
put into one hole, four or five inches deep, at certain dis-
fances from each other. The seeds vegetate without any
other care, though the more industrious annually remove the
weeds, and manure the land. The leaves which succeed are
not fit to be plucked before the third year’s growth, at
which period they are plentiful, and in their prime.

In about seven years the shrub rises to a man’s height,
and as it then bears few leaves, and grows slowly, it is cut
down to the flem, which occasions an exuberance of fresh
shoots and leaves the succeeding summer; some, indeed,
declear cutting them till they are of ten years’ growth. In
Japan, the tea-tree is cultivated round the borders of the
fields, without regard to the foil, but as the Chinese export
considerable quantities of tea, they plant whole fields with
it. The leaves are not collected from the cultivated plant
till it is three years old; and after growing seven or ten
years, it is cut down, in order that the numerous young
shoots may afford a greater supply of leaves.

The belt time to gather the leaves of tea is while they are
yet small, young, and juicy; and the different periods in
which they are gathered are particularly described by
Kämpfer. The first gathering of the tea-leaves, according
to this author, commences about the latter end of February,
when the leaves are young and unexpanded. The second
collection is made about the beginning of April, and the
third in June. The first collection, which consists only of
the finer tender leaves, is most esteemed, and is called Im-
perial tea. The second is called Tootsja, or Chinese tea,
because it is infused and drunk after the Chinese manner.
The liquor, which is the coarsest and cheapest, is chiefly con-
sumed by the lower classes of people. Besides the three kinds
of tea here noticed, it may be observed, that by garbling or
fortifying thefe, the varieties of tea become still further mul-
tiplied. The leaves are plucked carefully one by one, and
notwithstanding the seeming tediousness of this operation,
the labourers are able to gather from four to ten to fifteen
pounds each in one day. The tea-trees that yield often the
finest leaves, grow on the steep declivities of hills, where it is
dangerous, and in some cafes impracticable to collect them.
The Chinese are said to vanquish this difficulty by a singular
convenience. The large monkeys which inhabit these cliffs
are irritated, and in revenge they break off the branches,
and throw them down, so that the leaves are thus obtained.
The leaves should be dried as soon as possible after they are
gathered.

The buildings, or drying-houses, that are erected for
curing of tea, contain from five to ten or twenty small furnaces,
about three feet high, each having at the top a large flat
iron pan. There is also a long low table covered with mats,
on which the leaves are laid, and rolled by workmen, who
fit round it: the iron pan being heated to a certain degree by
a little fire made in the furnace underneath, a few pounds of
the fresh-gathered leaves are put upon the pan; the fresh and
juicy leaves crack when they touch the pan, and it is the
business of the operator to sift them as quick as possible with
his bare hands, till they become too hot to be easily endured.
At this instant he takes off the leaves with a kind of shovel
resembling a fan, and pours them on the mats before the
rollers, who, taking small quantities at a time, roll them in
the palm of their hands in one direction, while others are
fanning them, that they may cool the more speedily, and re-
tain their curl the longer. This process is repeated two or
three
three times, or oftener, before the tea is put into the flowers, in order that all the moisture of the leaves may be thoroughly dissipated, and their curl more completely preferred. On every repetition the pan is left heated, and the operation performed more slowly and cautiously. The tea is then separated into the different kinds, and deposited in the store for domestic use or exportation.

The Chinese know nothing of imperial tea, flower of tea, and many other names, which in Europe serve to distinguish the goodniss and the price of this fashionable commodity; but, besides the common tea, they distinguish two other kinds, viz. the vanni and fumbe, which are reserved for people of the first quality, and those who are sick. We have two principal kinds of tea in Europe; viz.

TEA. Green, which is the common tea of the Chinese, &c. F. le Compte calls it king tea, and says it is gathered from the plant in April. It is held very digestive, and a little astringent; it gives a paleth-green tincture to water, and its leaves are much twisted.

TEA. Bohea, which is the vanni tea, or hou tcha of the Chinese. F. le Compte makes this only differ from the green tea, by its being gathered a month before it, viz. in March, while in the bud; and hence the smallness of the leaves, as well as the depth of the tincture it gives to water. Others take it for the tea of some particular province; the foil being found to make an alteration in the properties of the tea, as much as the season of gathering it. It is all bought at Nan-kin, and thence brought into Europe, where it is now much in vogue.

As to the differences in colour and flavour peculiar to these two kinds, and to their varieties, Dr. Lettfn thinks that there is reason to suspect that they are, in some measure, adventitious, or produced by art. He has been informed by intelligent persons, who have resided some time at Canton, that the tea about that city affords very little smell while growing. The fame is observed of the tea-plants now in England, and also of the dried specimens from China. We are not, however, as he observes, to conclude from hence, that art alone conveys to tea, when cured, the smell peculiar to each kind; for our vegetable grasse, for instance, have little or no smell till they are dried and made into hay.

As to the opinion, that the green tea owes its verdure to an efflorescence acquired from the plates of copper on which it is suppos'd to be cured or dried, he shews that there is no foundation for this supposition. The infusions of the finest imperial and bloom teas undergo no change on the assuion of a volatile alkali, which would detect the minutest portion of copper contained in them, by turning the liquors blue.

The fine green colour of these teas, with so little reason, hath been attributed to green copperas; as this metallic salt would, on its being dissolved in water, immediately set on the astringent matter of the leaves, and convert the infusion into mix, as happens when a chalybeate water has been employed in the making of tea.

On the whole, Dr. Lettfn thinks it not improbable, that some green dye prepared from vegetable substances, is employed in the colouring of the leaves of the green teas. And Neumann supposes, that the brown colour and the flavour of the bohea forts are introduced by art. Both the green and bohea teas have an agreeable smell, and a lightly bitterish astringent taste: with solution of chalybeate vitriol, they strike an inky blackness. They give out their smell and taint both to water and spirituous menstrua; to water, the green forts communicate their own green tincture, and the bohea, their brown; but to rectified spirit, they both impart a fine deep green. The extract, obtained by gently drawing off the menstrua from the filtered tinctures, are very considerably astringent, and not a little ungrateful; but the spirituous molfo.

Savary also speaks of a sort of red tea, or Tartar tea, called Honan tcha, which tinges the water of a pale red, and which is said to be extremely digestive: by means of it the Tartars are said to be able to feed on raw flesh. Its taint is earthy, and much the last agreeable of them all: but this is scarcely known in England.

Tea is to be chosen of the broadest smell, and as whole as possible: and the greatest care is to be taken that it has not been exposed to the air to pall and evaporate.

The drink, tea, is made in China, and throughout the greatest part of the East, after the same manner as in Europe; viz. by infusing the leaves in boiling water, and drinking the infusion hot. Indeed, among us, it is usual to temper its bitterness with sugar, but the Orientals use it without the addition of sugar or milk.

However, the Japanese are said to prepare their liquor in a somewhat different way, viz, by pulverizing the leaves, straining the powder in hot water, and drinking it as we do coffee.

From the account given by Du Halde, this method is not peculiar to the Japanese, but is also used in some provinces of China.

The common people, who have a coffee tea, boil it for some time in water, and make use of the liquor for common drink. Early in the morning, the kettle, filled with water, is regularly hung over the fire for this purpose, and the tea is either put into the kettle enclosed in a bag, or by means of a basket of proper size pressed to the bottom of the vessel, that there may be no hindrance in drawing off the water.

The Bantjia tea only is used in this manner, whole virtues, being more fixed, would not be so fully extracted by infusion.

The Chinese are always taking tea, especially at meals: it is the chief treat with which they regale their friends. The most moderate take it at least thrice a day; others ten times, or more; and yet it is computed, the consumption of tea among the English and Dutch is as great, in proportion, as among the Orientals.

With regard to the commercial history of tea, we may observe that it was first introduced into Europe by the Dutch East India Company, very early in the 17th century, and that a quantity of it was brought over from Holland by lord Arlington and lord Oflory, about the year 1666, at which time it was sold for £6. per pound. But it appears, that before this time, drinking of tea, even in public coffee-houses in this country, was not uncommon; for in 1660, a duty of 5d. per gallon was laid on the liquor made and sold in all coffee-houses.

The present consumption of it is immense, both among the rich and poor. Dr. Lettfn tells us, that he has been informed, that at least three millions of pounds are allowed for the annual home consumption, not including the incredible quantity smuggled into the kingdom; and that the East India Company have generally in their warehouses a supply for three years.

In the appendix to sir George Staunton's Account of Lord Macartney's Embassy to China, we have several statements relating to the tea-trade with China. The average of teas exported from China to Europe in foreign ships, for nine years, viz. from March 1772 to 1780, the average of the number of ships being twelve, was 13,198,201 lbs.; in English ships, at the average of nine, 5,639,939 lbs.: the total average of ships is twenty-one, and of exported tea 18,838,140 lbs.
TEA.

18,848,140 lbs. The annual consumption of tea by foreigners in Europe is estimated at 5,900,000 lbs.; and the consumption of Great Britain and her dependencies is at least 13,338,140 lbs., which, at 200,000 lbs. per ship, would employ thirty-eight large ships constantly in the China trade, instead of eighteen ships, as above, most of which were small, one fleet going out when another is coming home.

The above is exclusive of private trade teas, brought legally and illegally into Europe. It is said, upon the authority of confidential information, that the English ships have often smuggled from 1000 to 3000 chests of tea each; and also that the foreign captains bring a large quantity of tea, which they either smuggle at sea, or throw into the sea, the punishment being severe. The losses to the public on 1000 chests of hyson tea smuggled, is above 20,000l.

The average quantities for one year of each sort of tea sold by the East India Company in ten years, from March file 1773 to September file 1782 inclusive, exclusive of private trade, which was trifling, are as follow:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th>lbs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bohea</td>
<td></td>
<td></td>
<td>3,075,307</td>
</tr>
<tr>
<td>Congou</td>
<td></td>
<td></td>
<td>523,272</td>
</tr>
<tr>
<td>Souchong and Pekoe</td>
<td></td>
<td></td>
<td>92,572</td>
</tr>
<tr>
<td>Singlo</td>
<td></td>
<td></td>
<td>1,824,747</td>
</tr>
<tr>
<td>Hyfon</td>
<td></td>
<td></td>
<td>218,839</td>
</tr>
</tbody>
</table>

Total: 5,742,464

See Commutation A.B.

As to the properties of tea, they are strangely controverted: the Eastern nations are at least as much poiffessed with an idea of their extraordinary virtues as the Europeans; but it is, perhaps, because imagination bears as great a sway there as here. The reason why the gout and stone are unknown in China, is ascribed to the use of this plant.

Tea is extolled as the greatest of all medicines: moderately and properly taken, it acts as a gentle astringent and corroborative; it strengthens the stomach and bowels, and is good against nausea, indigestions, and diarrhoea. It acts also as a diuretic and diaphoretic. The immoderate use of it, however, has been very prejudicial to many, who have been thereby thrown into the diabetes.

And also in Europe, infusions of tea-leaves have been extravagantly condemned by some, and commended by others. From the contradictory opinions, even of medical writers, on this subject, the natural inference seems to be, that they possess neither noxious nor beneficial powers, in any very considerable degree. They seem, when moderately used, to be for the most part innocent; in some cases they seem to be salutary; in some they are apparently prejudicial. They dilute thick juices, and quench thirst more apparently, and pass off by the natural excretions more freely, than most other fluids; they refresh the spirits in heaviness and sleepiness, and seem to counteract the operation of inebriating liquors.

From their manifest astringency, they have been supposed to strengthen and brace up the solids, but this effect experiences do not countenance; as it is in disorders, and in constitutions in which corroborants are more serviceable, that the immoderate use of tea is particularly hurtful; in cold indolent habits, cachexias, chlorosis, dropsies, and debilities of the nervous system. Lewis's Mat. Med.

Dr. Lettison has particularly inquired into the medical qualities and effects of tea, and has observed that infusions of bohea and green tea contribute to preferve sweet some small pieces of beef immersed in them, he infers that they possess an astringent power, when applied to the dead animal fibre, and from their striking a purple colour with falt of iron, he deduces their astringent quality.

From other experiments he concludes, that the activity of tea chiefly resides in its fragrant and volatile parts; and that if the use of it be beneficial or injurious to any particular constitution, it becomes so principally by means of this odorous fragrant principle. He apprehends that it is the safest course to use the infusion of the more ordinary kinds of this plant, which abound less with this fragrant principle. Or the tea may be boiled a few minutes, in order to dilute this volatile part, which fands charged as the causes of those nervous affections, that are said to be produced, or aggravated, by the use of this liquor. By this process may likewise be extracted more copiously the more fixed, bitter, and Romaic parts of this vegetable.

Dr. Lettison, who seems to be thoroughly persifled of the occasionally noxious effects of this volatile principle, in the finer teas especially, recommends this last mentioned mode of making tea, or the substitution of the extract instead of the leaves; by the use of which the nervous relaxing effects, which follow the drinking of tea in the usual manner, would be in great measure avoided. This extract has been imported hither from China, in the form of small cakes, not exceeding a quarter of an ounce each in weight, ten grains of which might suffice one person for breakfast; but it might easily be made here by simple decoction and evaporation, by those who experience the noxious qualities of the volatile principles of this plant.

It may be farther observed, that the effect of drinking large quantities of any warm aqueous liquid would be to enter speedily into the course of circulation, and pass off as speedily by urine or perspiration, or the incease of some of the secretions.

Its effects on the solid parts of the constitution would be relaxing, and thereby enfeebling.

If this warm aqueous fluid were taken in considerable quantities, its effects would be proportionable, and still greater if it were well diluted instead of nutriment. The infusion of tea, however, has these two peculiarities. It is not only poiffessed of a sedative quality, but also of a corroporative astringency; by which the relaxing power, ascribed to a mere aqueous fluid, is in some measure corrected on this account. It is, perhaps, less injurious than many other infusions of herbs, which, besides a very strong aromatic flavour, have very little, if any, rhypotie, to prevent their relaxing debilitating effects.

So far, therefore, tea, if not too fine, if not drank too hot, nor in too great quantities, is perhaps preferable to any other known vegetable infusion. And if we take into consideration, likewise, its known enlivening energy, our attachment to it will appear to be owing to its superiority in taste and effects to most other vegetables. See Dr. Lettison's Natural History of the Tea-tree, with Observations on the Medical Qualities of Tea, and Effects of Tea-drinking. 4to. 1772.

Tea may be considered as a very powerful aphrodisiac; and accordingly, a physician of considerable eminence in his profession, imputes the amazing population of China, amongst other causes, to the general use of it. Percival's Ed. p. 63.

We shall close this part of the article with a transcript of its medicinal powers, as they are stated by Dr. Cullen (Mat. Med. vol. ii.) "With respect to its qualities as a medicine, that is, its power of changing the state of the human body, we might suppose it ascertained by the experience of its daily use; but from the univerfality of this use in very different conditions of the plant, and in every possible condition of
TEA.

the persons employing it, the conclusions drawn from its effects must be very precarious and ambiguous, and we must attempt by other means to ascertain its qualities with more certainty.

"To this purpose it appears, from the accurate Dr. Smith's experiments De Actione Mufcularis, No. 36, that an infusion of green tea has the effect of destroying the sensibility of the nerves, and the irritability of the muscles; and from the experiments of Dr. Lettoum, it appears that green tea gives out in distillation an odorous water, which is powerfully narcotic.

That the recent plant contains such an odorous narcotic power, we might presume from the necessity which the Chinese find of drying it with much heat before it can be brought into use; and that, even after such preparation, they must abstain from the use of it for a year or more, that is, till its volatile parts are still farther disintegrated; and it is said, that unless they use this precaution, the tea in a more recent state manifestly flows strong narcotic powers. Even in this country, the more odorous teas often shewed their sedative powers in weakening the nerves of the florinach, and indeed of the whole system.

"From these considerations we conclude very firmly, that tea is to be considered as a narcotic and sedative substantive; and that it is especially such in its most odorous state, and therefore left in the bohea than in the green tea, and the most so in the more odorous, or what are called the finer kinds of the latter.

"Its effects, however, seem to be very different in different persons; and hence the different, and even contradictory accounts that are reported of these effects. But if we consider the difference of constitution, which occasions some difference of the operation of the same medicine in different persons, and of which we have a remarkable proof in the operation of opium, we shall not be surprised at the different operations of tea.

"If to this we add the fallacy arising from the condition of the tea employed, which is often so inert as to have no effects at all; and if we still add to this the power of habit, which can destroy the powers of the most powerful substances, we shall not allow the various and even contradictory reports of its effects to alter our judgment, with respect to its ordinary and more general qualities in affecting the human body.

"From the experiments above-mentioned, and from the observations which I have made in the course of fifty years, in all sorts of persons, I am convinced that the qualities of tea are narcotic and sedative.

"It has been often alleged, that some of the bad effects imputed to tea are truly owing to the large quantity of warm water which commonly accompanies it, and it is possible that some bad effects may arise from this cause; but from attentive observation I can assure, that wherever any considerable effects appear, they are in nine of every ten persons entirely from the qualities of the tea; and that any like effects of warm water do not appear in one of a hundred who take in this very largely.

"But while we thus endeavour to establish the poisonous nature of tea, we do not at the same time deny that it may sometimes do us useful qualities. It is very possible, that in certain persons, taken in moderate quantity, it may, like other narcotics in a moderate dose, prove exhilarating, or, like thefe, have some effect in taking off irritability, or in quieting some irregularities of the nervous system.

"As its bad effects have been often imputed to the warm water that accompanies it, so we have no doubt that some of its good effects may also be ascribed to the same cause, and particularly its being so often grateful after a full meal."

"By 9 Geo. II. c. 35, if a vessel, coming from foreign parts, and having 6 lbs. or more of tea on board, shall be found at anchor, or within two leagues of the shore, &c. all such tea, with cask and package, shall be forfeited. The importer of any coffee, tea, or cocoa-nuts, shall within thirty days enter the said tea, &c. and warehouse it. (10 Geo. II. 10, 5 Geo. III. c. 43.) That which is landed without entry and warehousing shall be forfeited. But this shall not extend to any coffee or tea imported by the East India Company. The coffee and tea intended for home consumption shall be entered and the duty paid. (10 G. c. 10.)"

"A permit shall be given for the removal of tea from any warehouse, whether it be bohea, congon, souchong, or pekoe tea; and such tea shall be in the permit be specified under the denomination of black tea; and if the tea be neither bohea, congon, souchong, nor pekoe tea, then such tea shall be specified under the denomination of green tea. 43 Geo. III. c. 129."

"By 13 Geo. III. c. 44. no licence shall be granted to the East India Company to export tea, unless there remain in the warehouses a quantity not less than ten millions of pounds weight.

"No tea is allowed to be imported, except from the place of its growth, on pain of forfeiture. (11 Geo. c. 30.) And by 24 Geo. III. c. 38. all the duties upon tea imported, sold, or used in this kingdom, shall cease from September 15, 1784; at which period the East India Company is discharged from the payment of duties on tea in their warehouses; and afterwards there shall be paid a duty of 12d. per cent. computed upon the gross prices for all tea delivered by the Company to the purchasers, which duty shall be drawn back on exportation to any place where the drawback is already allowed. The Company is required to make four sales in the year, and to sell such quantity as shall be sufficient to supply the demand, provided an advance of 1d. per lb. be bid upon the prices at which the teas shall be put up; and at the first four sales after passing the act, these prices shall not exceed the following rates: viz. for bohea tea, 1s. 7d. per lb.; congon tea, 2s. 5d. per lb.; for souchong tea, 3s. 3d. per lb.; for fingho tea, 3s. 4d. per lb.; and for hyfon tea, 4s. 11d. per lb.; and afterwards the whole price at which the teas are put up, shall not exceed the prime cost, with the freight and charges of importation, lawful interest from the time of the arrival of such tea in Great Britain, and the common premium of insurance. In lieu of the duties on tea, this act substitutes an additional duty on windows. See COMMITUTION A6.

"By this same act, the inland duty upon cocoa-nuts and coffee shall cease from September 15, 1784, and the following additional duties be paid; viz. for every pound of cocoa-nuts, the produce of British America, 6d. and the produce of any other place, Is. 6d.; and for every pound of coffee, the produce of British America, 6d. and the produce of any other place, 2s. 6d.; and these duties are subject to an additional impost of 5 per cent. and 5 per cent. thereon imposed by 19 Geo III. c. 25. and 22 Geo III. c. 66.

"If coffee or tea are intended to be taken out for exportation, they shall be delivered out on security that they shall be exported, and not relanded. 13 Geo. c. 10.

"No drawback shall be allowed on tea exported, except to Ireland, &c. where the whole duty on exportation shall be allowed. 18 Geo. II. c. 26. 17 Geo. III. c. 27. 43 Geo. III. c. 69.

"Every person having in his custody more than six pounds weight of tea, is a dealer; and selling without a licence, to be
TEA

be had for 12l., shall forfeit 5l. a month. (11 Geo. c. 30.) If any person offer any tea to sale without a permit, or a pedlar with one, the person to whom it is offered may seize the same, &c. 9 Geo. II. c. 35. See Coffee.

Every person dealing in tea, &c. shall cause to be painted or written upon the door of his shop, the words dealer in coffee, tea, cocoa-nuts, or chocolate, on pain of 200l. (19 Geo. III. c. 69.) And any dealer buying of any person who has not this inscription, incurs forfeiture of 100l., and any other person 10l. By 20 Geo. III. c. 35, no person shall trade in coffee, tea, or chocolate, without a licence, at the price (by 43 Geo. III. c. 69.) of 5l. 6d., under penalty of 20l.

The adulteration of tea is subject to a penalty of 100l. besides the forfeiture of the same, and for every pound of dyed leaves of tea, 5l. 11 Geo. III. c. 50. 17 Geo. III. c. 29.

At the East India Company's sale of teas, an account shall be taken of the buyers and prices, and the best bidder shall within three days deposit with the Company, or their clerks, 40l. for every tub or chest of tea, on pain of six times the value, and such sale shall be void, and the same shall in 14 days after be put up again. (18 Geo. II. c. 26.) And by 13 Geo. III. c. 44, the deposit for every tub and chest of bohea tea shall be 4l. By 13 Geo. III. c. 44, tea may be exported. No tea shall be received, with or without a permit, within the limits of the bills of mortality; and no tea, exceeding 20lbs. weight, shall at one time be received, with or without a permit, out of the said limits, on pain of forfeiture. (21 Geo. III. c. 55. 22 Geo. III. c. 68. 23 Geo. III. c. 70.) All tea feazed and condemned shall be sold to the best bidder. (24 Geo. III. sess. 2. c. 47.)

Tea carried in the night, with or without a permit, except in certain circumstances, shall be forfeited, and may be seized by any officer for the inland duties as tea. 21 Geo. III. c. 55.

Tea, Buckthorn. See Rhamnus.

Tea, German. See Speedwell.

Tea, Mexico, Chenopodium ambrosioides of Linnaeus, is a species of chenopodium, which, as well as the Jerusalem oak, or chenopodium botrys, are natives of the southern parts of Europe, and found annually with us in gardens. Infusions of the leaves and flowery heads of both these plants, which are not unpalatable, drank as tea, are said to be of service in humoral asthma and coughs, and other disorders of the breast; they are supposed to be antiapopomitic and antihysterical. Lewis's Mat. Med.

Tea, New Jersey. See Chenopodius.

Tea, New Zealand. See Philadelphia.

Tea, Ossego. See Monarda.

Tea, Paraguay, or South Sea. See Paraguay.

Tea, West Indian. See Sida.

Tea Soup, in Rural Economy, which is prepared from the tea, liquid, or infusion of some form of vegetable substance or other, such as bay, cut straw, or haullum, &c. by thickening it a little with some form of mealy material, or mashed potatoes, or other thick roots, after being boiled or steamed.

Tea, in Geography, a river of England, in the county of Buckingham, which runs into the Ouse near Stony Stratford.

TEAHOWRAY. See Portland Island.

TEAK, or TEEK, a species of timber that occurs frequently in various parts of the East Indies, and which is applied to a variety of domestic and nautical purposes. Extensive forests of these trees border on the banks of the Godavery within the mountains, and supply abundance of ship-timber for the adjacent ports. The teak forests, from which the marine yard at Bombay is furnished with that excellent species of ship-timber, lie along the western side of the Ghat mountains, and other contiguous ridges of hills, as the N. and N.E. of Baffon; the numerous rivulets that descend from them affording water-carriage for the timber. Major Rennell reproaches the unpardonable negligence with which Europeans are chargeable for delaying to build ships of war for the service of the Indian seaf. They might be freighted home, without the ceremony of regular equipment, as to masts, sails, and furniture; which might be calculated to answer the purpose of the home-paflage at the best fesfon; and crews could be provided in India. Teak ships of 40 years old and upwards are not uncommon in the Indian seas, while an European ship is ruined there in five years. The teak is called the Indian oak. See Tectona.

TEAKI, in Geography, an island in the Mediterranean; twenty miles long, and four broad. This island was anciently called "Ithaca," and is memorable in Grecian history for being the kingdom of Ulysses; some Europeans call it "Val de Compare." N. lat. 38° 47'. E. long. 21° 40'.

TEAL, Querquedula, in Ornithology, the Anas crecca of Linnaeus, the smallest of all the duck kind. Its beak is black, and its head, and upper part of its neck, of a reddish-brown; but there runs on each side of the head a green streak from behind the eyes quite to the back part, and between these is a black spot under the eyes; there is a white line which separates the reddish colour from the green. The lower part of the neck, the shoulders, and the sides, are very beautifully variegated with black and white streaks; the breast and belly are of a dusky greyish-white; the first beautifully spotted with black; the vent black; the tail sharp-pointed and dusky; the coverts of the wings brown; the greater quill-feathers dusky; the exterior webs of the leffer marked with a gloppy green spot, above which is another of black, and the tips white; the irides whitish; and the legs dusky. The female is of a brownish ash colour, spotted with black, and has a green spot on the wing, like the male. Ray and Pennant. See DUCK.

TEAL, Crested, Querquedula cristata, a name given by Bellonius and some others to a species of duck, remarkable for a tuft of feathers an inch and half long, hanging down from the back part of the head, and thence called the tufted duck; but more known among authors by the name of capo negro. See DUCK.

TEAL, Summer, Anas circa of Linnaeus, is apprehended by Mr. Pennant to be no other than the female of our teal, though Linnaeus has described it as a distinct species. See DUCK.

Summer teal is also a name given in some places to the garrancv.

TEAM, THEAM, or THAM, in our Ancient Cyclopedia, signifies a royalty granted by the king's charter to a lord of a manor, for the having, retraining, and judging bondmen, neifs, and villains, with their children, goods, and chattels, in his court.

TEAM, in Agriculture, the number of horses, oxen, or other animals which are drawing together at once in the same plough, cart, waggon, or other carriage. There is a great variety of different sorts of teams employed in field, road, and other sorts of labour, which is carried on by means of domestic animals; and it is of very great importance to ascertain which of them is of the greatest advantage, and the cheapest in the different uses and intentions.

In all sorts of farming work, in the field as well as on the road, the heavier kinds of strong horses, and those of the clofe, short, compact, punch breeds, have hitherto, for the most part, been employed for the purpose of team labour; and for
for the dray, and every fort of similar heavy work, where a
flow, steady, strong draught is required, they are also un-
questionably the most proper and fuitable, as long experi-
extence has fully proved. But a considerable alteration has
lately taken place in the kinds which are made ufe of as
teams for carrying on the lighter sorts of road-work, whether
by means of carriages or other vehicles.

It has been found, that the flouter fort of hofes, pof-
selling a little blood, are by much the best adapted to this
kind of labour of any, being much more active and ex-
dedious, as well as more durable, and lefs liable to fatigue
and to become tired out on the road. On this account they
form the teams for most sorts of coach and other carriage
labour, and in many instances for various heavier decrip-
tions of it: and it is not improbable but that, in some caxes,
they might be substituted as teams for farming work with
great propriety and advantage, in confequence of their
quicker pace, and having what is commonly called more
bottom.

Among farmers it has long been a difputed point, whether
horses or oxen form the most economical and advantageous
team for the purpofe of the cultivator in performing his
work, and it remains still undecided, though many intelli-
gent agriculturalists now incline to the fide of horse-teams,
except in particular circumstances and situations. And a
late writer has remarked, that the circumstances in which
the latter have been chiefly supposed to be more advantageous
than the former, are in their being kept at lefs expence,
and their not declining in value. But that, when ex-
amined, are perhaps not fo decisive of their superiority, as
they may at firft light appear; for where the work of the
farm is done by the younger fort of hofes, which is per-
haps the beft method, the decline in value cannot be of any
material confequence, while the superiority in point of the
difpatch of work is very great. And in regard to the
keep, as oxen cannot perform their labour well in con-
 tinuance without oats, or fome other fuftenance of a fimilar
kind, it would feem improbable but that young hofes
may pay nearly as weH as oxen, and be kept with little dif-
fERENCE in the expence. Indeed the common opinion, that
oxen are superior to hofes in the tillage of heavy lands,
does not at all appear to be well founded, efpecially when
drawn in yokes and bowes, as the poaching must be greater
than by hofes working at length. But when in harnets,
they may, from their greater ftadinefs, be preferrable: of
course, under different management, they are capable of be-
ing employed in both ways. But in all fuch cafes, as where
quick motion is of more importance than the steady drawing
of heavy weights, the horfe is much superior to the ox, as
well as in carting, where great fpeed is required in the un-
loaded flate, and wherever the roads or lands are rough,
sharP, and flony, as oxen cannot be fhod fo well as horfes
to fland fuch roads. And in harrowimg with light harrows,
where a jumping irregular motion is neceffary, it has been
fhewn in the Annals of Agriculture, that hofes are the moft
proper, and to be conftantly preferred. In fhort, that
teams of the ox-kind may be made ufe of with benefit in
many cafes in bufinefses about the farm, but they are incom-
patible with all sorts of diftant work, and efpccially on the
road, and in flony situations.

It has been remarked, in a late Calendar of husbandry,
that there are two cafes in which oxen are certainly more
beneficial than hofes: firft, when a farmer lives in a diftrict
where there is a breed of cattle well adapted to work; and,
secondly, when his farm is fo large, that he can buy in a
lot of cattle annually, that a small expence per head, and feel
no inconvenience in turning out fuch beasts from the teams
Vol. XXXV.
There 320,000 acres of land will produce 50,000 fat oxen, or 32 acres will produce five fat oxen; suppose them 270 lbs. per quarter each, or 5400 lbs. of beef from 32 acres; this is 1083 lbs. of beef per acre per annum; but a dairy, as it is said, produce more, and a flock of sheep well managed quite as much human food per acre. Little advantage, therefore, would it be derived from this change of substituting oxen for horses in agriculture, unless the use of horses on the road, and for purposes of pleasure, luxury, pomp, amusements, trade, mining, manufactures, commerce, and war, could be abolished or lessened.

Accordingly, Mr. Malthus thinks the advantages of luxury, when it falls short of actual vice, are certainly great; it cannot be denied, but it contributes to the comforts, enjoyments, and consequent happiness of a nation; but if carried too far, it will completely defeat its own purpose; the fortunate is to stop short of the mark.

In the clear, full, and excellent account of the state of agriculture in the county of Middlesex, the very able and experienced author has brought together into one point of view a great number and variety of the different objections and reasons, which either operate against or wholly prevent the use of oxen for the purpose of performing team-labour; and which the inquirer, who wishes for more full information on so important a subject, may do well to consult, as they place the question with much clearerness and decision greatly in favour, and on the side, of the horse.

In fact, the writer thinks it very clear, that those persons who prefer horses to oxen, for the purpose of labour, display superior knowledge in agriculture. This opinion, he says, is sanctioned by the practice of nine-tenths of the better husbandmen in the nation. In proportion as Britons become enlightened, they lay aside ox -teams; and experience has now so completely established the superiority of horses, as to render their employment almost universal. And under this system, the science and practice of agriculture have improved more rapidly than at any former period of time. "The number of horses used in husbandry are nearly," says the writer, "1,200,000. If half this number were to be superceded by oxen, in the proportion of two oxen to one horse, it would require 1,200,000 such cattle to do the fame quantity of labour as is now done by 600,000 horses. The difference of the two numbers would be an increase to that extent of our labouring cattle. The other 600,000, in the place of so many horses, as well as the increased number, feed in the same manner as cows, and on a similar herbage; consequently the whole 1,200,000 would deprive us of the means of supporting so many cows. So unwise a measure would reduce the number of our cows to one-fourth of their present number. The veal, milk, butter, and cheese, would be diminished in that proportion; and in consequence of this scanty production of the dairy, the price would be far exorbitant, that none but the most wealthy could afford to eat of these things.

"After what has been said, need I add, that every ox used in husbandry at this time deprives the nation of a cow, and of all the comforts which that animal is calculated to bestow. The introduction of oxen, to do one half the labour now done by horses, would deprive the labourers of the greater part of their diet: a dearth would be the inevitable consequence, until the numbers of our people were reduced to equal the canteens of their food, or until the oxen could be fattened and slaughtered, to make way for the return of the more valuable cow. Hereafter I shall expect, the farmers in theory only, who are advocates for ox -teams, to change their notes, and write in favour of a team to be drawn by cows."


**TEA**

gree, as is obvious from the vast consumption of expensive food that must take place. The yearly expense of keeping a labouring horse and an ox, previous to the late rise in the different articles that are made use of as food, has been stated, in the sixteenth volume of the Annals of Agriculture, to be in the general amount as follows: viz. that of a working horse, 17l. 10s. 6d.; and that of a working ox, 13l. 16s. 10d.; so that the difference of expense in favour of the ox is 4l. 8s. 6d.

The difference in the expenses of food, since the above period, may have probably demanded the addition of rather more than one-third to these accounts; though they are at present much lowered.

The training or breaking; in the oxen for team-labour is commonly performed by first confining them by means of a halter or rope, while the yoke or harness is put on, and then placing them between a pair of old steady oxen both before and behind, so that they can neither push forward nor backward in an improper manner; and another, perhaps better, way is to yoke them singly with an old team-ox, which is not a free worker, as they are less liable to be hurt in hot weather in this way. They may also be first broken in, by being employed in other sorts of labour before they are put to the plough.

Oxen are more apt to tread, poach, and injure the land, especially where it is of a heavy, clayey, moist nature, when worked in yokes, than when in harness; yet some districts prefer the system of yokes and bows, either single or double, to the harness method, which is a later practice. And there is a wide difference of opinion among practical farmers about the superiority of the one or the other method. Some very sensible men, who have tried both ways, contend that three in harness are equal to as much work as four in the other mode, and that they are more quick in their motions, and work with more ease; while others, equally well experienced, are decidedly of opinion that the old established method is superior to the new, and that any number in yokes are equal to the same number in collars. The question is, of course, not yet well decided; however, it is agreed, that it is unfavourable to work them too hard in any method.

The necessary proportion of horses to the extent of the farm, is also a circumstance that is of much interest to the farmer; but which must of necessity vary greatly, according to the nature, situation, and state of the land, as well as the mode of husbandry under which it is conducted.

In deciding the necessary proportion of team, the farmer must likewise consider the extent which the sward or grass-land bears to that which is in the flate of tillage; as where the proportion of the former is considerable, there will be much less team-work to be executed, of course a much less strength may be sufficient. Where the farm is under the hay system, as there is seldom much team-work, except in conveying the produce and carting manure, a smaller extent of team is mostly sufficient, in proportion to the quantity of land, than in other farms. And in the dairy management, the same is the case; but as in this case it becomes necessary to raise green crops as cattle food, a somewhat stronger team may be required than in the former case.

In perfectly tillage farms, whether conducted under the naked fallow system, or the more improved management under the convertible husbandry, a much greater force of team will be required, in proportion to the extent of land that is to be cultivated. Some reduction of team-labour may, however, be effected in both cafes, by having recourse to green mithering crops in the place of the followings, which should always be done as much as possible.

There can be no doubt but that there are some other sorts of animals, besides those of the horse and ox kind, that may be occasionally employed in team-labour. The mule is an animal well calculated for this purpose, from its being more hardy, and enduring work a greater length of time, or to a more advanced age, than the horse. In some cafes, the smaller sorts of mules have been recommended, as more hardy and useful; but in Worcestershire, large mules have been found more beneficial for team purposes.

The afo may likewise be employed for team-labour with advantage, in small concerns, from its hardy nature, and being capable of living on more scanty fare than the horse; and it is very useful for numerous purposes about the farm-house.

Whatever sort of teams may be made use of upon farms, they should always be well attended to, and no neglect of any kind suffered in regard to them; and when attacked by disease, recourse be had as quickly as possible to proper remedies.

**TEAN,** in Geography, a river of England, which runs into the Dove, 2 miles N.E. of Uttoxeter.

**TEANO,** a town of Naples, in Lavora; 14 miles N.W. of Capua.

**TEANUM, TIANO,** in Ancient Geography, a town of Italy, in Campania, towards the south-east. It was a Roman colony, and a considerable town.—Also, a town of Italy, so named Apulum by Strabo, and Apulenum Pliny.

**TEAP,** in Rural Economy, provincially a top name.

See *Rams.*

**TEARNE,** in Geography, a river of England, which runs into the Severn, near Shrewsbury.

**TEAPOUR,** a town of Hindoostan, in the circle of Sumbul; 13 miles N.N.E. of Sumbul.

**TEARS,** in Physiology, the peculiar limpid fluid secreted by the lacrimal gland. This fluid is defined to prepare the transparency of the cornea, by keeping it moist, and removing from it foreign substances. In man a preternatural flow of tears is excited by different passions of the mind, especially grief; but it is doubtful if this takes place in any inferior animal. See *Eye, Man, and Passion.*

The fluid of tears has been examined *chemically* by Fourcroy and Vauquelin, but their account of its properties is not so complete as could be wished. It is colourless and transparent, without any smell, but of a perceptibly saline taste. Its specific gravity is somewhat greater than that of water. It tingles vegetable blues green. It unites with water, both cold and hot, in every proportion. The mineral acids produce no change upon it. When evaporated to dryness, a number of cubic crystals of muriate of soda are obtained; and there are also distinct traces of a free alkali, which is soda. One hundred parts, when evaporated, leave only four of solid matter, of which about one is saline matter, and the rest a peculiar animal substance, which these chemists considered as a species of mucus, and which is separated likewise from tears in their fluid state, in the form of flakes, when alcohol is poured upon them. This peculiar animal matter, on exposure to the air, is flated to pollicis, the properties of gradually absorbing oxygen, which renders it thick and vitrified, and of a yellow colour. In this state it is insoluble in water, and remains long suspended in it without alteration. Hence, says Berzelius, if these observations are to be depended upon, this substance bears a considerable affinity to the mucus of the nose, which probably, like that of flowers, is used in *A a 2*
of tears, is secreted in a fluid state, and afterwards converted, by the action of the air during respiration, into the flate we usually see it. The fold matter of tears obtained by evaporation, when burnt, leaves some traces of the phosphates of lime and soda. Journ. de Physique, t. xxxix. p. 256.

TEASARRAH, in Geography, a town of Bengal; 72 miles W. of Midnapour.

TEASEL, or TEAZEL, in Botany. See DIPSACUS.

Bede the common wild species of this plant, there is a large kind of it, the heads of which are of singular use in raiseing the nap upon woollen cloth, for which it is propagated in great quantities in many parts of the west of England.

The foils most adapted to the growth of this plant are those of the more strong and deep kinds, but which are not too rich; as loamy chaff, and such as have strong marly bottoms, and are fit for the growth of wheat crops.

The most favorable situations are those that are rather elevated, open, and incline a little to the south; and the higher grounds, particularly where the country is inclined, are the most advantageous.

For the preparation of the ground, where it is a lea, it should be ploughed up deeply in the early part of the year, as in the beginning of February; and where it is inclined to moisture, it should be executed in narrow ridges of not more than three ploughs each, the furrow slices being laid over in as even and regular a manner as possible, the line mould from the furrows being raised by the plough or spade so as to cover the surface. But in lands that are sufficiently dry, and which are broken up from flubble, the ploughing may be deferred to a later period, and be laid in ridges of much greater breadths, and in a more flat form.

Mr. Billingley, in his Agricultural Report of Somersetshire, has remarked, that in the providing feed, it should conflantly be taken from such plants as are the most perfect of their kind, and the most productive in heads; as there is much difference in the quantity that is afforded by different plants, some producing nearly a hundred, while others do not afford more than four. It should be suffered to remain till it becomes perfectly ripened, and be used while fresh.

With respect to the proportion of feed, that which is mostly employed on the acre is from about one to two packs, according to the above writer; but some make use of a larger quantity, as two packs, or more.

It may be noticed, in regard to the fæfen of putting in crops of this fort, that it is commonly about the middle of March or beginning of April. The common method of putting this fort of crop into the ground is the broad-cast, it being fown evenly over the surface, in the manner that is practised for turnips, fown in this way. But before this is done, the land should be well harrowed down, in order to afford a fine flat of mould as a bed for the feed. It is then to be covered in by a flight harrowing with a light short- tined harrow, such as is used for grass-feeding. Some, however, prefer a light half-harrow for this purpose.

However, this fort of crop may be sown in rows in the drill method, at the distance of eight, twelve, or more inches from each other, in the same way as that of the drilled turnip. But this method is not, we believe, yet much employed by those who are in the practice of raising crops of this nature.

In the after-culture of crops of this kind, much depends on the land between the plants being kept perfectly clean and free from weeds; in having them let out to proper and sufficient distances, as about twelve inches; and in having them well earthed up. Some cultivators perform frequent diggings, that the ground may be rendered cleaner and more moist, consequently the growth of the plants be the more effectually promoted. This busness has usually the name of side-digging, or spitting, and is executed with great dispatch by labourers that are accustomed to perform it. When these diggings have been finished, nothing further is necessary till the period of cutting, which is generally about the end of the month of July in the second year, which is known by some of the uppermost heads beginning to blow; as when the blossoms fall, they are ripe, and in a state to be cut and secured.

This cutting is mostly executed at three different times, at the distances of about ten days or a fortnight from each other. It is performed by means of a knife, contrived for the purpose, with a short blade, and a firing attached to the haft. This last is done, in order that it may be hung over the hand or wrist, when the leaves are to be stripped from the item parts. A pair of strong gloves is likewise necessary. Thus prepared, the labourer cuts off the ripe heads along the rows or lines, or otherwise, with about nine inches of item, and ties them up in handfuls with the item of one that is more perfectly ripened, or other wise. And on the evening of the day on which they are cut, they should be put into a dry shed; and when the weather is fine, and the air clear, they should be taken out and exposed to the sun daily, till they become perfectly dry. As soon as they are completely dried, they should be laid up in a dry room, in a close manner, till they become tough and of a bright colour, and ready for use. They should then be sorted or separated into three different kinds, by opening each of the small bundles. These are distinguished into kings, middlings, and straws, according to their different qualities. They are afterwards, the author of the above report says, made into packs, which, of the first sort, contain nine thousand heads; but when of the second, twenty thousand; the third is a sort of very inferior value. By some, before forming them into packs, they are done up into what are termed flaves, by means of close sticks, when they are ready for sale.

The produce in crops of this nature must be very uncertain, there being sometimes fifteen, or sixteen, or more packs on the acre; and at other times scarcely any. The produce is dispofed of to the cloth manufacturers in Somersetshire, Wilthire, and Yorkshire.

It has been flated, that formerly an acre of land, if well grown, and what is deemed a full crop, often produced nine packs of kings, nineteen of middlings, and two of straws.

In the county of Olfex, they have a singular practice of cultivating and growing seafel crops with feeds, such as coriander and caraway, producing thereby a sort of treble crop. It is flated, that the seeds of these several plants are fown together, very early in the spring, upon a strong old ley, once ploughed; and generally yield very considerable returns.

It is noticed, that the head of the seafel is of a conical form, two or three inches in length, and one or one and a half in diameter at the bottom, or largest end; armed on every part with small strong points, turned a little downwards; and are bought by the woolen manufacturers, who fix them upon frames, calculated to cover a cylinder, which is made to turn round, and slightly catch their fays, bays, and other such articles, which another part of the weaver's machine draws against them; by which means the knap is raft to almost any length the manufacturers wishes.

The largest burs, and those moft pointed, are esteemed the
they are now called mah teafels; they are mostly used in the dressing and preparing of flocks and coverlets; the smaller kind, properly called the *fullers* or *drapers' teafels, and sometimes the female teafels, are used in the preparation of the finer flufs, as cloths, rafesin, &c. The smaller kind sometimes, called *linnois teafels*, are used to draw out the knap from the coarser flufs, as bays, &c.

The leaves of the common wild teafel dried, and given in powder or infusion, have been commended by fome as a powerful remedy against flatufes or crudifides in the womb.

**TEATE, CHIETI, in Ancient Geography, a town of Italy, in Samminium, teated on a mountain, at a small distance from the Adriatic gulf. It was the capital of the people called Marrucini. Ptol. In the Itinerary of Antonine, this town is marked on the route from Rome to Hadria, by the Valerian way.**

**TEATHE, in Agriculture, a term applied to the dung of cattle in feeding of green crops; or which, in a more particular fene, signifies the soil or improvement left upon the paffure lands in feeding them with live-flock, or the fertilizing effects which are produced on them, in confequence of fuch cattle or other live-flock being faternoed upon them with any fort of food, whether fuch improvements be caufed by their dung, urine, treading, breath, perfpiration, warmth of their bodies, or other fimilar caufes. It is a term much made use of in the husbandry of Norfolk.**

**TEATHING, the practice of eating turnips, or other fuch matters, off, upon young wheat crops, or in other ways, in the early spring months, by live-flock, as heef and bullocks. It is often written *tailing* by farmers.**

It is a fingular husbandry, which the writer of the Norfolk Agricultural Report met with on entering the diftrict of Fleg, in coming from Yarmouth. It confifts in carting turnips on to wheat in February and March; they call it *pull and throw on wheat, eating them on that crop by heeep and bullocks, if heep are kept; if not, by bullocks alone.*

The outflift grafs-land in fome of the heef diftricts in the northern parts of the island, which are inclofed in a temporary manner, and intended to be broken up for tillage, are fometimes teathed, by confining black cattle and heeep upon them in fomething of the fold manner.

**TEATINOS, in Geography, a small island in the Pacific ocean, between the island of Chilio and the coaft of Chili, S. lat. 43° 35'.**

**TEATS, SORE, in Neat Cattle, an affection in fome of the cow-kind, to which some are much more fubjeft than others; especially fuch as have newly or lately calved. When the teats of these animals are affected during the fummer months, they often become ulcerated, and by the teazing of the flies, the cattle are rendered difficult to be milked; they also become a very great nufance at the periods of milkling, as the difcharges from them are apt, without much attention, to pafs between the fingers of the operator into the milk-pail, and fpoil the milk.**

The affection is caused by inflammation, irritation, and too much dilution of the parts by the milk.

In order to the removal of it, the milk fould be firft frequently drawn, and the parts well wafted with soft fop and warm water; after which, a fubfiance comofed of elder ointment and wax melted together, to which is then added a little alum and fugar of lead, in fine powder, may be used to the parts after milking at night and in the morning; or a weak folution of white vitriol and a little fugar of lead, in soft water, may be made ufe of in the fame way, in fome cafes, with more advantage. The addition of a little affa-fofida, and fuch like fubfiances, in powder, is, it is faid, benefical in the fummer feaion in driving away the flies.

**TEA, in Geography, a town of Arabia, in the province of Hedsjas; 128 miles S.S.E. of Mecca.**

**TEBALDEO, ANTONIO, in Biography, an Italian poet, was born at Ferrara in 1463. Although brought up to the medical profesfion, he chiefly devoted himself to poetry, and it was his custom to accompany his verses with his lute. Of thefe, which were much admired, a collection was publifhed by his cousin Jacopo, in 1499, and often reprinted. In Latin verse he fecceeded better than in thofe of his native language; and it is faid, that pape Leo X. gave him 500 gold ducats for a fingle epigram. After the death of Leo, whose favour he enjoyed, he was reduced to the neceffity of begging 30 florins of cardinal Benno. He died at Rome in the year 1537. Specimens of his compositions in both languages are given in Mr. Roscoe's Life of Leo X. Gen. Biog.**

**TEBECRIT, in Geography, a town of Algers, near the Mediterranean; 2 miles from Ned Roma.**

**TEBEBELT, a town of Africa, in the country of Taflet; 100 miles S. of Sugalmeifa.**

**TEBELDA, in Ancient Geography, a town of Africa, in the interior of Pontus Galaticus. Ptol.**

**TEBESTA, in Geography, a town of Africa, in the kingdom of Tunis, on the borders of Algers, where are found several beautiful ruins. It was anciendy very strong; but, in the year 1057, was laid wafte by Muley Mahomet. Tebifa is well supplied with water, and the environs abound in almonds and nuts; 130 miles S.S.W. of Tunis.**

**TEBET, or THIEFET, the fourth month of the civil year of the Hebrews, and the tenth of their ecclefiafical year. It anfwered to part of our December and January, and has but twenty-nine days. The second day of this month is the fift of the octave of the dedication of the temple, after it was purified by Judas Macabbeus. See 1 Mac. iv. 59. John xxi. 22.**

The tenth day of this month is obferved by the Jews as a foul, in memory of the fiege of Jerufalem by Nebuchadnezzar, in the ninth year of Zedekiah.

**TEBIQUARI, in Geography, a river of South America, which rifes in S. lat. 27°, and joins the Iquay, to form the Rio Grande, in S. lat. 30° 35'. Alto, a river of South America, which runs into the Paraguay, 8 miles below Assumption.**

**TEBOA, See Hoop's Island.**

**TEBSEN, a town of Egypt, on the Nile; 16 miles N. of Cairo.**

**TEBU. See TAHUK.**

**TEBUHANAS, a town of Africa; 15 miles S.E. of Sugalmeifa.**

**TECALA, a town of European Turkey, in Thelfaly; 30 miles N.W. of Larifba.**

**TECALETH, a town of Morocco; 121 miles W.N.W. of Morocco.**

**TECALA, in Ancient Geography, a town in the northern part of Germany. Ptolemy.**

**TECQUET, or TECHER, in Geography, a town of Africa, in the country of Sus, fitated in a fertile foil, abounding with grain, dates, figs, grapes, and fugar-canes. Here is a manufacture of Morocco leather; 150 miles S.W. of Morocco.**

**TECH, a river of France, which rifes in the Pyrenees, and runs into the Mediterranean, near Elne.**

**TECHE, a river of Louisiana, which connects with the Vermilion; and there are the principal rivers of the Atka- kapas. Their general courses are nearly the fame to the lake
lake Taffe; their channels are deep, and they are connected by streams from the lake Taffe. The Tceh is much larger and longer than the other, being upwards of 200 miles in length. The Taffe is a beautiful lake of clear water, about 10 miles in circumference. The principal settlements of the Attakapas are on each side of the Tceh, mostly westerly, and on the Vermilion. Besides the culture of cotton, maize, &c. they have the advantage of extensive natural meadows to support their herds, which, on account of the natural mildness of the climate, are kept without much trouble. The inhabitants of the Attakapas are generally wealthy, and live as luxuriously as the planters of the Mississippi. Upon the whole, this part of Louisiana seems destined to become one of its richest districts.

TECHIA, a town of the Arabian Irac; 160 miles N. of Bagdad.

TECHICAL, Technical, formed of τεχνος, artificial, of τεχνη, art, something that relates to art.

In this sense we say, technical words, technical verbs, &c. And in this sense Dr. Harris entitles his dictionary of arts and sciences, Lexicon Technicum.

TECHICAL is more particularly applied to a kind of verbs, in which are contained the rules or precepts of any art, thus digested to help the memory to retain them. See Artificial Memory.

Technical verbs are used in chronology, &c. Such, e. g. are those expressing the order and measure of the calenders, none, &c. those expressing the feasons, and those expressing the order, &c. of the figures.

F. Labbé has composed a set of technical Latin verbs, including all the epochs in chronology; and F. Buffier, after his example, has put both chronology and history into French, and even geography also.

Technical verbs are commonly composed in Latin; they are generally wretched ones, and often barbarous; but utility is all that is aimed at in them: to give some idea of which we will here add a fewinstances. The catufts include all the circumstances which make us partakers with another in a theft, or other crime, in these two technical verbs.

"Jullio, conllium, confenfus, palpo, recurfus, Participaneus, mutus, non obfants, non manifefts."

The first of F. Buffier's technical verbs of the history of France, are these:

"Ses lois en fourt cents Pharamond introitu, Cloflion Chevelu, qu'Actius vanquit. Merovee; avec lui combatit Attila; Childeric fut chaffé, mais on le repella."

Technical Words, are what we otherwise call terms of art.

TECHUKS, in Geography, the most remote people of Afitic Raffia, who far exceed 1000 families, are generally found in small camps, pitched by the sides of rivers. Their rude tents are square, consisting of four poles, supporting skins of rein-deer, which also form the covering; before every tent are spears, and arrows, fixed in the snow against any sudden attacks of the Koriaks, who, though of the same face, are a more malicious and enterprising people. In the midst is a stove, and the bed consists of small branches of trees, spread on the snow, and covered with deer-skins. Their habitations and food are dirty and disgusting; and the dress of the women consists only of a single deer-skin, fastened on the neck, so that on loosening one knot the body remains naked. The features are coarse, but they have not the flat noses, nor little hollow eyes of the Kamtchadales; and Leather pronounces their countenances to have nothing of the Asiatic form, in which assertion he had been preceded by Pallas and Tooke. The Koriaks are supposed not to exceed 2000 families.

TECKLENBURG, a town of Westphalia, and capital of a county to which it gives name; 7 miles S.W. of Osinbruck. N. lat. 15° 15'; E. long. 7° 35'. Also, a county and principality, bounded on the north and east by the bishopric of Osinbruck, and on the south and west by the bishopric of Munster; about 20 miles in length, and 10 in breadth. This county was formerly more extensive, including the county of Lingen, and part of the bishopric of Munster. The soil is fertile, and yields good corn, and pastures for cattle; the river abounds in fish, and in several places are quarries of stone; the chief manufactures are linen cloth. It is now annexed to Westphalia.

TECLITIUM, or TELITIUM, in Ancient Geography, a town of Lower Media, upon the route from Vinniutum to Nicomedia, along the Danube. Anton. Itin.

TECOANTAPEQUE, in Geography, a sea-port town of Mexico, in the province of Guasaca, situated at the foot of a volcanic mountain, near the Pacific Ocean; 160 miles S.E. of Acapulco. N. lat. 16° 2'; W. long. 99° 10'.

TECOLATOA, or TELOLATA, in Ancient Geography, a town of Gallia Narbonennis, upon the Valerian way, between Ad Turrem and Aquae Sextiae. Anton. Itin.

TECOLITHOS, in Natural History, the name of a gem, otherwise called Syriacus lapis, and Judiacus lapis, good for diffusing the human calculus. See Syriacus and Judiacus.

It has this name from τεκλιθος, I dissolve, and λιθος, a stone; because it dissolves stones.


This genus is separated from Bignonia by Jussieu, solely because of the character of the capsule or pod is contrary, not parallel, to the valves; and he enumerates as species the B. flava, radicans, and pantophysyla of Linnaeus, besides the above plant of Hernandez from Mexico. Mr. Brown adds to the B. pandora, Andr. Repof. t. 86; which is B. Pandora, Curt. Mag. t. 865; B. pandorea, Venten. Malmais. t. 43; though the last-mentioned author says he found the partition of the capsule parallel to the valves, and therefore this species is a Bignonia according to Jussieu. So indeed it remains in Mr. Alton's Hort. Kew. v. 4. 34, with the specific name of anfralis, by the substitution of which Mr. Brown has happily got rid of the above pandorae confluence; and there we shall readily leave it, only remarking that it is, according to Mr. Brown, a native of Fort Jackson, and of the tropical part of New Holland, not of Norfolk Island. The flem is twining. Leaves pinnate, with an odd leaflet, smooth. Flowers paniculate, white, with a purple throat. For the other species above named, see BIGNONIA, n. 11, 14 and 15. We doubt whether the tribe in question is sufficiently well known at present for botanists to undertake its generic reformation. Nor can we permit the above name of our distinguished friend Jussieu to pass without animadversion, as nothing can be more contrary to found principles of nomenclature, nor to his own declaration against barbarous names in his preface. The preface is peculiarly ill applied, as the original Tecomaechiti of Hernandez appears to be Solandra grandiflora, or very like it, having simple leaves.

TECONA,
TECOTA, in Geography, a town of Hindoostan, in Dowlatabad; 21 miles W. of Poona.

TECOTICA FALLS, a cañada in the river Kennebeck, about 65 miles from its mouth.

TECORIPA, a town of New Mexico, in the province of Sonora; 70 miles E. of Pitquin.

TECIR, a town of Affatic Turkey, in the government of Mafaf, situated on a rock near the west side of the Tigris, on the borders of the Arabian Irak. Tecir is thought to be the Birtha or Vitra of the ancients, described as a very strong fortres, and famed to have been constructed by Alexander the Great. It was chosen in the seventh century for the abode of a Jacobite primate, and increased to a considerable town. In 1393, it was taken by Timur Bec, who put all the soldiery that defended it to death. The ruins are extensive, and the number of homes about to five or six hundred, with a caravansera and two coffee-houses; 120 miles S. of Mafaf. N. lat. 34° 37'. E. long. 42° 37'.

TECOTON, in Botany, a name altered by Linnaeus from the East Indian name of this valuable timber-tree, Tek, Tekka, Theka, or Talk, and made classical, according to a method which sometimes used, from tekko, a carpenter, or tekno, a piece-work in timber, or iron, both derived from tawka, to build; alluding to the use of the wood in building houses as well as ships.—Linn. Suppl. 20. Schreb. 141. Willd. Sp. Pl. v. 1. 1088. Mart. Mill. Dict. v. 4. Thunb. Nov. Gen. diff. 4. 71. Ait. Hort. Kew. v. 2. 11. Gert. t. 57. (Theka; July. 108. Lamerick Illustr. t. 136.) Clafs and order, Peridendra Monogynia. Nat. Ord. Periconae, Linn. Vities, Jiff. Gen. Ch. Cal. Perianth inferior, of one leaf, bell-shaped, its margin in five, occasionally fix, ovate blunt segments, permanent. Cor. of one petal, funnel-shaped; tube shorter than the calyx; limb in five, occasionally fix, deep, ovate, crenate segments, incurved at the point, twice as long as the tube. Nectar a glandular ring, at the base of the germen. Stamen. Filaments as many as the segments of the corolla, inserted, alternately therewith, into the tube, decurrent, thread-shaped, erect, rather longer than the limb; anthers heart-shaped; two-lobed, erect. Pit. Germen superior, nearly globular, downy; bylve thread-shaped, downy, slightly curved, the length of the corolla; stigmas two, revolute, obtuse. Peric. Drupa nearly globose, depressed, dry, spongy, hairy, concealed in the enlarged, inflated, membranous calyx. Seed. Nut bony, the shape of the drupa, with a terminal knob, of four cells, with follicular kernels. EfF. Ch. Corolla five-cleft. Stigma divided. Drupa dry, spongy, within the inflated calyx. Nut of four cells. Obs. The terminal flowers are often fix-cleft.

1. T. grandis. Tek-wood, or Indian Oak. Linn. Suppl. 151. Willd. n. 1. Ait. n. 1. Roxb. Coromand. v. 1. 10. t. 6. (Theka; Rhode Hort. Malab. v. 4. 57. t. 27. Jatus; Rumph. Amboin. v. 3. 34. t. 18.)—Native of the mountainous parts of the Malabar and Coromandel coasts, as well as of Java, Ceylon, and other countries of the East Indies, flowering during the hot season; but not till the tree is arrived at a considerable age and magnitude, so that there is little chance of seeing it blossom in our stoves, where young plants are sometimes introduced. The trunk in its native country grows erect, to a vast height, with copious spreading opposite branches, crossing each other, quadrangular when young. Leaves spreading, opposite, falcated, elliptic-oblong, acute, entire, slightly waved, with one rib and many transverse veins, whose subdivisions are finely reticulated; their upper side rough like a file; lower finely downy; their length is generally about a span, but the leaves on young branches sometimes measure eighteen inches or two feet, and are nearly half as much in breadth. Panicles terminal, hoary, very large and spreading, repeatedly subdivided in an opposite manner, with lanceolate bracteas. Flowers very numerous, comparatively small, being scarcely half an inch long; externally hoary; internally yellow, dotted with red. Anthers yellow. Fruit the size of a small cherry, rough, brown, in a large membranous, brown, bladdery calyx, resembling the Phyllita Alteggeni in general shape, but hardly so large.

The wood of this tree is, as Dr. Roxburgh remarks, by far the most useful timber in Asia; it is light, easily worked, and though porous, both strong and durable. For ship-building it is peculiarly excellent for its lightness, and its durability either in or out of the water. Pegu affords the largest quantity of this timber, which is easily brought down the rivers of that country, and sold cheap. The fame author mentions that the banks of the Godavery, in Hindoostan, afford a teak which is beautifully veined, much closer in the grain, and heavier, than fulful. This fort is peculiarly fitted for furniture, and gun-carriages.—Teak-wood, according to Thunberg, fetches a considerable price at the Cape of Good Hope, on account of its great utility, in a country where large timber-trees are rare.

TECOSTAGUS, or Volca Tetragonus, in Ancient Geography, a people included among those who inhabited the southern part of Gaul, belonging more particularly to Languedoc.

TECSTRICES, in Ornithology, are the lesser coverts of the wings of birds, or the feathers which lie on the bones of the wings.

TECUCI, or Tecutsch, in Geography, a town of European Turkey, in Moldavia, on the Birlat; 70 miles W. N. W. of Galatz.

TECELEUT, a town of Africa, in the empire of Morocco, situated near the coast of the Atlantic, on the edge of a mountain. In the year 1514, this town was sacked by the Portuguese, and a great number of inhabitants carried away for slaves. It has since re-peopled; 15 miles E. of Mogodor.

TECUM DUCES. See DUCES.

TED, in Agriculture, a term made use of to signify the spreading abroad new-mown grass, which is the first thing done in order to its being dried, and made into hay. Much in the process of hay-making depends upon good and complete tedding of the grassy hay in the beginning of the work.

TEDANUM, Tedoxus, or Tidanus, in Ancient Geography, a river of Illyria, which served as a boundary between this province and Apuglia. Play.

TEDBURY, in Geography. See TETBURY.

TEDDER, Teddon, or Tetber, in Agriculture, a rope or chain by which an animal is tied, and confined in the fields, that it may not pasture on too wide a range. This is very seldom a good practice, or one that should be much followed.

TEDELER, or Tedelin, in Geography. See DELILY. TEDESCHI, or Tudeschi, Nicolas, in Biography, an eminent canonist, sometimes called "the abbot," and sometimes "Pamorjtanus," from the city of Palermo, the city in which, as some say, he was born, in 1360, though others make Catania his native place. At the age of fourteen he took the habit of St. Benedict in Catania, and afterwards pursued his studies at Bologna. We shall not follow him through all the stages of his advancement from one degree of reputation, and from one flation of honour and trust
We were extremely curious to learn when and where Handel's grand Te Deum for the peace of Utrecht was first performed. It was natural to imagine that it was first heard at St. Paul's, and that queen Anne went thither in state on the occasion, which Sir John Hawkins positively affirms, telling us that, "in 1713, the treaty of peace at Utrecht being finished, a public thanksgiving was ordered for the occasion, and Mr. Handel received from the queen a command to compose a Te Deum and Jubilate, which were performed at St. Paul's cathedral. her majesty herself attending the service." Hist. Muf. vol. v. p. 269.

But though in a paragraph of the Post Boy, July 2, 1713, it is announced that "her majesty goes the 7th to St. Paul's, being the day appointed for the thanksgiving, accompanied by the houses of the lords and commons," yet in the same newspaper, from Saturday July 4, to Tuesday July 7, 1713, the public was informed that "her majesty does not go to St. Paul's July 7, as she designed, but comes to St. James's (from Windfor) to return thanks to God for the blessings of peace."

If Handel's elaborate composition had been executed at St. Paul's, a style of music so new, forcible, and masterly, must have had a great effect on an English congregation, who had never heard ecclesiastical music so accompanied. Purcell's voice parts, always pleasing, well accented, and expressive, had little affinity from an instrumental band. Instrumental music, except organ playing, was but little cultivated in our country during his time. But Handel, besides his experience in Germany, had heard operas and masses performed by great bands in Italy, with such precision and effects, as were unknown in our country till he came hither to teach us.

Handel's Te Deum for the battle of Dettingen, 1743, and Graun's for the king of Prussia's victory at Cohn, in 1757, are the most celebrated compositions to that sacred hymn of the last century, and the most likely to survive the present.

TEDASTUM, in Ancient Geography, a town placed by Ptolemy in the interior of Liburnia, near Aruzic.

TEDFEN, or TODYN, in Geography. See Tedzen.

TEDIF, a town of Syria, in the pachalic of Aleppo.

Here is a Jewish synagogue; and the inhabitants have a tradition that one of the minor prophets refided here. On a hill near this town are some sepulchres and aqueducts cut in the rock; 21 miles E. of Aleppo.

TEDINGHAUSEN, a town of the duchy of Bremen; 9 miles S. of Otterberg.

TEDIM, in Ancient Geography, a town of Arabia Deserts, near Mecopotamia. Ptol.

TEDLA, or TADLA, in Geography, a province of the empire of Morocco, in the kingdom of Fes, which extends along the eastern side of Mount Atlas, and has to the west the province of Shavaya, and to the S. Morocco. This is a rich province, abounding in sheep, whose wool is so fine, that no silk is softer; it is used in the manufacture of caps worn by the opulent, and is sold at Fes at a very high price; its exportation being prohibited, it is confumed by the inhabitants. The province contains 450,000 inhabitants.

TEDNEST, or TEDOEST, a town of Africa, in the empire of Morocco. This town was destroyed by the Portuguese in the year 1514, and in part rebuilt by the Jews; 40 miles N.E. of Mogador.

TEDONG. See Tirun.

TEDSI, a town of Africa, in the country of Sus, situated to the east of Tarudant; 90 miles S.W. of Morocco.

TEDZEN,
TEDZEN, a town of Peru, in Khoraflan, on a river of the same name; 32 miles E. of Mejfigh.—Also, a river of Peru, in the province of Khoraflan, supposed to be the ancient O coun, and next in size to the Osus. It has its source near Saraks; and after receiving many streams, and in the number Meshed river, falls into the Capfian sea, in N. lat. 38° 14'.

TIE, in the Magae. See Breast-Plate.

TEE-Square. See Square.

TEEBAKAN, in Geography, a small island in the East Indian sea, near the N. coast of Borneo. N. lat. 7° 52'. E. long. 119° 30'.

TEECHA, a town of Bengal; 45 miles E. of Calcutta.

TEEDIA, in Botany, so named by Peron, we know not with what meaning.—"Perf. Syn. v. 2. 166." Brown in Ait. Hort. Kew. v. 4. 47. See Capharia, sp. 3. \textit{incida}, on which alone this genus is founded, being distinguished by having a berry instead of a capsule, as is remarked in the place indicated. We have not had an opportunity of examining whether this be really the case, or whether it be a capsule with or without a pulpy coat; nor do we know how far Wildenow's suggestion, that all the Cape species possibly have a similar seed-veil, is well founded.

TEEFEE, in Geography, a town of Africa, in Kasson; 30 miles N.W. of Amsterdam.

THEEHEGAN, a small island in the East Indian sea, N. of Borneo. N. lat. 7° 49'. E. long. 117° 30'.

TEEKOOL, a small island in the Soooloo Archipelago. N. lat. 6° 6'. E. long. 120° 25'.

TEELINA, a town of Bengal; 10 miles W. of Chongchou.

TEEMBE, a town of Africa, in the country of Fouta. N. lat. 10° 28'. W. long. 10° 48'.

TEEMBOO, a town of Africa, in the country of Fouta. N. lat. 9° 59'. W. long. 10° 18'.

TEEN-TALLOW, a town of Hindoostan, in Guzerat; 20 miles S.E. of Brodera.

TEERAH, a province of Candahar, W. of Paishavarr.

TEERANDAZEE, a town of Candahar; 8 miles E. of Suffa.

TEERRAWHITTE, the south-west point of the northernmost island of New Zealand, in the South Pacific ocean, and the N. side of Cook's Straits.

TEERWISCH; a town of Pruflia, in the province of Oberland; 8 miles N.N.W. of Orteilburg.

TEES, a river of England, which rises on the borders of Cumberland, and runs into the German ocean, about ten miles below Stockton, N. lat. 54° 42'. The whole course forms a boundary between the counties of York and Durham.

TEESDALIA, in Botany, received that name from Mr. R. Brown, in memory of the late Mr. Robert Teesdale, F.L.S., who died on Christmas-Day, 1804. This accurate English botanist was, for many years, a feedman in the Strand, but retired from business some time before his death, retiring first at Ranelagh, near Chelsea, and afterwards at Turnham-Green. He was the author of "\textit{Planta Ebracensias; or a Catalogue of the more rare Plants, which grow wild in the neighbourhood of Cadle Howard, in the North Riding of Yorkshire, disposed according to the Linnaean System}!" published in the \textit{Transactions of the Linnaean Society}, v. 2. 193. The author composed this catalogue whilst he was gardener to the earl of Carlisle.—Brown in Ait. Hort. Kew. v. 4. 83. Sm. Tr. of Linn. Soc. v. 11. 283. Compend. Pl. Brit. ed. 2. 98. Claib. and order, \textit{Teesdal.}

TEESEE, 

\begin{itemize}
  \item \textit{T. nudicaulis.} Naked-tailed Teesdalia. Ait. n. 1. Sm. Tr. of L. Soc. v. 11. 286. (Iberis nudicaulis; Linn. Pl. 927. It. Oeland. 139. Sm. Fl. Brit. 692. Eng. Bot. t. 327. Curt. Lond. Gæt. 6. t. 42. F. Dan. t. 323. Burfa paltorxin minima; Ger. Em. 276. Shepherd's Græf; Petiv. Herb. Brit. t. 50. f. 2.)—Petalcs unequal. Native of dry gravelly situations in the northern parts of Europe, flowering in April or May. It occurs about London, Norwell, and Burry, but is not a general English plant. The root is small, tapering annual. Herb varying much in luxuriance and number of leaves. Leaves several, almost entirely radical, pinnatifid in a lyrate manner, ruffled, roughish principally at the edges. Stalks unbranched; the central one always erect and naked; the rest ascending, spreading or decumbent, often bearing a leaf or two. Flowers white, very small, corymbose. Calyx smooth, often purplish. Two inner or upper petals as long as the calyx; outer ones full twice as long; all entire. The remarkable scales on the flaments were first particularly noticed in \textit{English Botany}. On these Mr. Brown founds his principal generic character, omitting the irregularity of the petals, in which this plant agrees with \textit{Iberis}, though very little in its habit, which is rather that of a \textit{Lepidium}. (See those articles.)
  \item \textit{T. regularis.} Regular-flowered Teesdalia. Sm. as above, 286. (Lepidium nudicaule; Linn. Sp. Pl. ed. 1. 643. ed. 2. 898. Loc. It. Hfip. 155. Naiutritum minimum, folias tantum circa radicem; Magnol. Bot. Monsp. 187. t. 186. N. folii pinnafidos, caude nudo floribus tetrandris; Gerard Gallopr. 347, excluding the \textit{Iberis} of Linnaeus.—Petals equal. Stamens but four. Native of dry elevated gravelly places in the south of France, and above the convent of St. Bernard at Madrid, flowering in the early spring. The root is annual. Whole herb to precisely resembling the foregoing, except in being usually rather less luxuriant, that it is scarcely possible to distinguish them, except by the flowers. The petals of the present are all of equal size, spreading, longer than the calyx. Stamens only four, two at each broad side of the germen, each bearing a white expanded scale, as in the \textit{T. nudicaulis}; two shorter, or more spreading flaments entirely wanting. It is much to be wished that seeds of this species could be procured from Montpellier, that we might compare both in a living state. Linnaeus was always persueded of their being distinct. 
\end{itemize}
TENSEE, in Geography, a town of Africa, in Kajaza. N. lat. 14° 50'; W. long. 9° 27'.

TRESHOO LOOMBOO, or LUMNANG, a town and large monastery of Thibet, consisting of three or four hundred habitations of the Gylongs, besides temples, manufac, and the palace of the sovereign pontiffs, all built of stone; 2 miles S.W. of Szigatshem.

TRESTA, or Yo Sanpo, a river of Asia, which rises in Thibet, and runs into the Ganges by two streams, one 25 miles N., the other 80 E.S.E. of Moorhobead.

TEETBADDY, a town of Bengal; 27 miles N.E. of Dacca.

TEETH, Diffuse of the. The diseas which affect the teeth and the parts connected with them, are usually divided into two kinds; namely, into such as are termed common, because they are also met with in other parts; and into those which are called proper, being observed only in the teeth. Hence, as the celebrated Plocen has remarked, the subject may be conveniently treated of under the following heads.

Doctrina de Morb. Dentium, &c. Lovani, 1796.

Of Natural Dentition.—The process by which the teeth make their way through the gums, is named dentition, (see Dentition,) which may be divided into the first and second.

1. Of the First Dentition.—In the sixth or seventh month after birth, the first or milk teeth make their appearance through the gums. The two middle incisors of the lower jaw are those which most frequently first come out, and, in the course of a few weeks, they are generally followed by the two middle incisors of the upper jaw. At length, after some months more, the lateral incisors and the canine teeth show themselves. The anterior molars, or front grinders, do not commonly pass through the gums until the child is a twelvemonth old.

The third and fourth grinders are cut about the tenth or twelfth year, and the dentes sapientiae at the age of twenty, or even at a more advanced period of life.

The first dentition, therefore, lasts from the sixth month to the second or third year. The second from the ninth to the thirteenth year.

But it is to be observed, that the interval between the periods when the teeth are actually cut, is subject to very great variety, both with respect to different teeth and different children. Sometimes a month, sometimes half a year, and, on other occasions, a whole twelvemonth will elapse between the first appearance of one tooth and that of another.

The cutting of each tooth has two distinct phases; the first of which has been called the periodus ingressus; the second, the periodus egressus.

The first phase is usually observed in the fourth month, or about six weeks before the tooth passes through the gums. It happens when the tooth, in consequence of its augmented size, begins to press against the bony lamina of the socket, so as to make them recede. At this period the child feels a degree of itching in the gums, and hence it is that he now frequently puts into his mouth his fingers, or other hard bodies, and compresses them by strongly biting them between the gums. The secretion of the saliva is increased. The gums become red, and swell in the situation of the tooth which is about to be cut. When the child fucks, he irritates and bites the nipple; he is also commonly troubled with a purging and a cough; he is watchful, cries frequently, and becomes feverish.

Sometimes, however, dentition takes place so easily, that none of the preceding symptoms are remarked.

After a few days, the above complaints generally cease, but not unfrequently come on again in about a fortnight or a month, that is to say, about the commencement of the second phase, or that in which the tooth makes its egress. Then the gum grows white, or exhibits whitish points in the situation of the tooth which is about to be cut. These are caused by the tooth itself, and disappear as soon as it has passed through the gum.

2. Of the Second Dentition.—In the seventh or eighth year, the milk-teeth, amounting in number to twenty, become loose, and gradually fall out, generally in the same order in which they were cut. Soon afterwards, the second or permanent teeth rise out of the gums. It hardly ever happens, that the second dentition produces any dangerous symptoms, the paffage through the alveolar processes and gum being now sufficiently capacious.

After the milk-teeth have spontaneously fallen out, or been extricated, they are almost always found to be destitute of fangs. This is a circumstance which has puzzled many eminent writers, and has even given birth to the erroneous doctrine, that the milk-teeth are never furnished with fangs. Suffice it here to say, that in the opinion of the best informed modern surgeons, the disappearance of the fangs is the effect of absorption.

Sometimes children, but more frequently adults, cut their teeth a third time. It is said that dentition has been observed to happen thrice in an infant five years of age; and Plocen was acquainted with a man, who was born with two of the grinding teeth, which were afterwards changed twice.

(Doctrina de Morbis Dentium, p. 10.) Even a fourth dentition has been noticed by some very experienced men.

Halleri, tom. vii. 1, 3o. p. 22.

Of Difficult Dentition.—The advance of the teeth out of the sockets or gums may be attended with the most alarming symptoms. But experience proves, that in numerous children, the whole semicircle of each jaw becomes furrowed with teeth, without the slightest mark of distemper either before, or during the progress of the tooth through the gums. In other instances the worst symptoms prevail, both while the teeth are making their way out of the sockets, and through the gums; such as an inflammatory swelling of the gums, tontils, and parotid glands; redness of the eyes and cheeks; vomiting, gripping pains, teneiinus, profuse diarrhoea with green evacuations, and sometimes obtinabite colic, and retention of urine. Fever, accompanied with cough and other catarhral affections, hiccup, intestinal or partial tetchis, convulsions, &c. are the symptoms by which, according to the estimation of several writers, nearly a third of children are destroyed in difficult dentition.

These are the common symptoms of difficult dentition; but occasionally peculiar ones arise, which not unfrequently subside as soon as the tooth is cut; as, for instance, gutta roacea (Lorry, Tract de Morb. Cutaneis, 1777, p. 411); deafness; amaurotic blindneses; enlargement of the knees; paralysis; and lymeees of one or both legs. (Pacher, Abhandlung aus der Wunderzney von den Zahnem, 25. 36.) Aplthe of the mouth; an inflamed tubercle over the tooth which is about to be cut; expiration ulceration, and even sloughing of the gums. Rachitis is also alleged to have its origin sometimes from difficult dentition.

These effects are particularly met with in very phlegmatic and irritable children; or in infants whose bowels are overcharged with irritating excrementitious matter. Too much laxity, or too great hardness of the gums, is hardly ever the sole cause of such symptoms.

With regard to the prognosis, it may be remarked, that favourable dentition is a sign of future health. Ricketty children almost invariably cut their teeth with difficulty.
The more numerous the teeth are which are making their way out together, the more severe are generally the symptoms, and the greater is the danger.

B hostile, collyb, heavy children are extremely liable to be carried off by denition.

The incisors and grinders usually come out with more ease than the canine teeth. Thin children, who are afflicted with acute fever, and whose bowels are open, are in less danger from denition. Infants who have a cough during this process, are often a long while in cutting their teeth. The foregoing prognostics accord with what was pronounced upon the subject by Hippocrates, whose accuracy remains unimpeached.

As the symptoms of denition are partly inflammatory, being accompanied with a strong determination of blood towards the head and brain; and partly spasmotic, in confluence of the sympathies of the teeth with other parts, the treatment requires that antiphlogistic and antispasmodic means be employed. It is necessary, therefore,

1. That the bowels be kept open with emollient clysters.
2. That leeches be applied behind the ears.
3. That the syrup of poppies, with nitre and one or two drops of laudanum be internally administered.
4. That the red part of the gum over the tooth which is about to be cut, be rubbed with a mixture of lemon-juice and honey, or cream.
5. That in the event of there being a tendency to convulsions, in addition to the other symptoms, a division of the gum be made over the tooth. By the majority of practitioners, indeed, the link is considered as by far the most useful and efficient means of relief.

This incision is to be made through the gum with the common instrument, well known by the name of the gum-lancet, which is far better for the purpose than an ordinary lancet, which is apt to cut the tongue and lips, especially when the child moves about much. The grinding teeth require a crucial incision; all the others a simple transfere cut completely through the gum. The wound is then to be examined with the finger, in order to ascertain that no tenet fibre over the tooth continues undivided. In this country, practitioners seldom apply any thing to the incision; but abroad, it is not uncommon to put to it a mixture of lemon-juice and honey.

Internally, antispasmodics may be exhibited, particularly the syrup of poppies, with the spiritus ammonis fuc- cinatus.

In order to promote denition, and render its effects on the constitution as mild as possible, the celebrated Plenck recommends, that as soon as the infant is five months old, its gums be rubbed several times a day with a mixture of lemon-juice and honey, first over the middle incisors of the lower jaw, and when these have come out, over those of the upper jaw.

Emollient remedies are said to relax the gums too much, the consequence of which is, that the loofe gum is slowly and difficulties perforated by the tooth, as instead of ulcerating, it is only relifted and rendered tenet.

The use of hard applications, as biting the root of marshmallows, smooth corals, boars' tusks, &c, render the gums callous; but more good might, perhaps, be derived, if substances with rough surfaees were employed.

A premature incision of the gum soon closes again, and therefore does little service; but we do not believe that the cicatrix, thus produced, can be any impediment afterwards to denition, as many have imagined; for it is an established fact, that cicatrices in general are more disposed to ulcerate and be absoved, than the original parts of the body.

We would never suffer any idle apprehensions of the above fort to deter us from dividing the gums, were there any chance of benefit from the proceeding. At the same time, we do not recommend this as a prophylactic measure, but as being proper only when illness, suspected to arise from denition, actually exists.

Premature Denition.—This is said to happen, when the milk-teeth come out before the infant is six months old. Sometimes children are even born with their teeth already cut. Rzaczynsky, Rhodius, P Ecule, and Stoerck, mention a boy, who had the molars at the time of birth. Also in an abortion of six months, and another of seven, teeth have been observed. (Halleri Elementa Physiol. t. vi. p. 19.) Van Swieten met with two incisors in an abortion of five months. (Comm. t. iv. p. 742.) In a very weak male child, born at eight months, Arnold saw two perfect teeth rise out of the lower jaw on the seventh day after birth, and grow with extraordinary quicknesses; but they fell out in the eighth week from their first appearance. Obs. Physico-Med. p. 70.

In general it is to be concluded, that early denition indicates great constitutional vigour and strength.

Of Backward Denition.—Backward denition is when the milk-teeth are not cut, though the child is a twelve month old, or even older. The proximate cause of this delay is generally referred by medical writers to languor and weaknesses of the constitution. But late denition is of several kinds.

1. Backward denition from an unknown cause sometimes happens, the teeth not making their appearance for a year after birth, notwithstanding the children have not any appearance of debility. Van Swieten met with a child of a healthy female child, who was nineteen months old when the cut the first tooth. Comm. t. iv. p. 742.

2. Backward denition from the rickets. It is universally known, that in rickety children the cutting of the teeth is a long while delayed. In these subjects the gums are always much relaxed, and we have already stated, that this circumstance is by no means favourable to denition. It is probable, also, that in rickety infants the teeth themselves are a long while before they are perfectly formed, it being well ascertained, that in such constitutions the deposition of the phosphate of lime takes place with extraordinary slowness and difficulty.

3. Backward denition of the dentes sapientiae. The wise teeth are seldom cut before the twentieth year, and sometimes they first come out in persons considerably advanced in years. Halleri Element. Physiol. t. vi. p. 28.

4. Late denition in adults. Sometimes this takes place a third time, chiefly with respect to the incisors; and instances are actually recorded, in which these teeth were cut in adults, or even in old persons. Halleri quotes examples, in which they were cut at the ages of 90, 100, and 118, and later. Halleri, l. c. t. viii. 1. 30.

Wrong Situation of the Teeth.—This happens when the teeth make their appearance in the palate, or in any place not comprised in the alveolar arches. The proximate cause of this unpleasing occurrence is the preternatural formation of the young tooth in an erroneous situation.

The cases may be of different kinds, in regard to the place in which the tooth occupies.

1. When a tooth grows out of the palate, it obstructs maluction, and by rubbing against the tongue, often makes it ulcerate. The inconvenience can only be remedied by extracting the displaced tooth.

2. The tooth may come out under the tongue. This case produces the same grievances as the preceding, and requires the same mode of relief.
3. The next curious circumstance which we have to notice, is the growth of teeth in the ovaries. It is now believed, that the teeth sometimes found in these organs, are not always the relics of a previous embryo, but may be formed there as if in situ. An instance, in which a tooth was formed in an encysted swelling in the orbit, has been lately recorded by Mr. Barnes of Exeter. See Medico-Chir. Trans.

4. Albinus records an example, in which a tooth grew out of the maxillary process below the orbit. It was concealed until it made its way out in this extraordinary situation.

Annot. Acad. t. i. p. 54.

5. The teeth have sometimes been observed inverted, their bodies being situated towards the jaw. Pollich, Inserm. Off. p. 25. Albin. c. 9. Pallin, c. 9.

Extraordinary Difference of the Teeth from each other. Sometimes the teeth are placed too distant apart, so that between their crowns large interspaces are left.

1. In children three years of age, the crowns of the milk-teeth are so close to each other, that they are laterally as if were in contact; but in children seven years old, there are wide interspaces between them. The reason of this is owing to the jaw increasing in size, while the dimensions of the teeth undergo no alteration. The second or permanent teeth, on the other hand, (at least the first twenty of them,) have larger bodies than the milk-fet.

2. Frequently the tartar invades itself between the crowns of the teeth, and occasions a considerable separation of them. We need scarcely observe, that the cure requires that the tartar should be taken off, and the teeth reduced into their natural position.

3. The deformity of which we are now treating, is occasionally so serious in adult subjects as to affect the preternatural breadth of the jaw, in which circumstance it is absolutely incurable.

Extraordinary Obligation of the Teeth. The teeth may be too crowded together, so that their crowns are laterally in contact. This defect may extend to one or all the teeth. The frequent consequence is, that the lateral margins of these parts become carious.

There are two species of the disorder.

1. The first arises from the great width of the crowns of the teeth, and it may be ascertained by ocular examination. In some instances, all the bodies of the teeth are preternaturally wide; in others, only a certain number of them.

The mode of cure consists in filing off a little of the lateral edges of the teeth affected.

2. The second species is caused by the uncommon shortness of the jaw. It may be known by observing that the crowns of the teeth are not too large, and that the alveolar arches are strikingly diminutive.

Here the mode of relief is the same as in the foregoing case.

Extraordinary Number of Teeth. Sometimes the number of the teeth exceeds what is the usual share of the human species in general; and this particularly occurs whenever the number amounts to more than thirty-two. Columbus has seen thirty-three (p. 34); Fauchart, thirty-three and thirty-four (edit. 2, tom. i. p. 3); Bourdet, thirty-six (p. 25); and Ingelfius, thirty-six, including twenty-four grinders. Text 2.

1. With respect to the redundant number of each claf, it is when there are fix incisories, or four canine teeth, or more than ten molares in one jaw. The case is incurable.

2. In some instances, the excessive number is owing to there being a double row of teeth. This malformation may happen to both jaws, or be confined to one. It has been noticed in both jaws by Munnig, p. 143; Plinus, c. xi. p. 623; C. Bartholinus, p. 464, &c.

Arnold met with a boy, fourteen years old, who had altogether seventy-two teeth in his mouth. There was a double set of the incisors, canine teeth, and three posterior grinders; but the anterior grinders were triple: consequently there were counted in each jaw eight incisors, two canine on each side, and twelve molares. The incisors were not arranged in an even double row, but each row seemed irregular, and its order as it were promiscuous. The arrangement of the canine and grinding teeth was more regular. None of these teeth were affected with caries. Obf. Phyf. Med. p. 69.

3. There may be a larger number of teeth than common, in consequence of the presence of one of the milk-teeth; for when the latter does not fall out at the usual period, the corresponding permanent teeth come out in the vicinity of it.

Here the cure consists in drawing the superfluous milk-tooth.

Deficient Number of Teeth. Sometimes the number of the teeth falls short of what is usual; and this happens whenever they are fewer in the adult subject than thirty-two.

1. The defective number may be owing to a preternatural shortness of the jaw. Sometimes one or more teeth remain concealed during life. Thus, the dentes fapientiæ are never cut in person{s} who have the upper or lower alveolar arch not sufficiently long.

2. The flux also makes a difference; women, generally speaking, having fewer teeth, than belong to men. Riolar, p. 38, and 39.

3. The deficiency in the number may proceed from a tooth having been drawn, or dropped out. This is evidently a case: which can only be remedied by the infection of an artificial tooth.

4. Lastly, the limitation of the number may be owing to infancy; for, in children under seven years of age, the natural number of the teeth does not exceed twenty.

Obliguit of the Teeth. The position of some or all the teeth may be oblique, an inconvenience which may be caused by the milk-teeth not being shed, by tartar infusing itself into the interspaces of the teeth, by looseness of the alveoli, and lastly, by a forcible luxation of the teeth affected. The milk-teeth seldom grow obliquely; the permanent ones do so much more frequently. The molares hardly ever rise in a wrong direction; and, in general, they are only the incisories and canine teeth which deviate from the right position.

With regard to the effects of such obliquity, we have to observe, that the teeth affected impede mastication, interfere with the articulation of words, seriously disfigure the countenance, and, unless drawn, or replaced in their natural position, may occasion incurable ulcers on the tongue, lips, or cheeks.

The differences of the obliquity make these cases divisible into several kinds.

1. The obliquity forward is when the tooth projects anteriorly, so as to hurt the cheek or lips. Such a tooth may cause ulceration of these parts, as already mentioned. The parotid duct has been known to be perforated, and a salivary fistula brought on, by an oblique tooth in the upper jaw. Pacht, l. c. p. 71.

2. The obliquity backward is when the position of the tooth inclines towards the centre or posterior part of the mouth, so as to be capable of injuring the tongue. Teeth, so circumstanced, have sometimes been the cause of ulcers on the tongue, which in point of obstinacy and malignity have truly vied with cancer. Plenck informs us, that by drawing
TEETH.

ing the left eye-tooth, he once cured an ulcer, which had existed half a year on the left edge of the tongue. P. 20.

3. The converging obliquity is when the crowns of the teeth converge in their situation, or even cross each other.

4. The diverging obliquity is when they diverge.

5. The lateral obliquity is when the side of the body of the tooth is turned more or less forwards or backwards.

6. Obliquity of the fangs. Sometimes the fangs of the teeth are curved so obliquely backwards or forwards, that the bottom of the foyets either project as a small ex- otothin, or is completely perforated.

Of the Reduction of an oblique Tooth.—With respect to one of the permanent teeth, which is rendered oblique by the presence of one of the first set, the treatment consists in immediately extracting the latter.

The milk-tooth may be known by its pearl colour, its more polished surface, and its smaller size. The permanent tooth is longer, whiter, stronger, and of greater breadth. The crowns only of the second set of grinders are shorter than those of the milk-toof. Albinus, Annal. Acad. i. ii. p. 19.

But an oblique permanent tooth may be replaced in its right position, by the following means.

1. When the child is very young, and the tooth quite recent, it may be reduced into its proper situation, by frequently pressing upon it with the finger in the course of the day.

2. Or the reduction may be effected with a double silk-thread, filled with wax and mastic. A noose is to be made at each end of the thread, and fastened to the adjacent teeth. The thread, being then divided into two, is to be made to cross two or three times firmly over the oblique tooth.

3. By a metallic plate. The length of the plate should exceed the measure of the two neighbouring teeth, together with the oblique one. Its width should be less than the height of the tooth. It is to be applied to the infide of each tooth as incline inwards, and to the outside of those which incline outwards. At the ends of the plate are two holes, through which the silk-threads, smeared with wax, are to be passed, and, after crossing each other, are to be tied over the oblique tooth.

4. By Bruner's machine. When the tooth does not admit of reduction by the preceding means, Bruner's machine may be tried. See A Bruner Einleitung zur WiUenshaft eines Zahnarztes, p. 83.

When several of the teeth are oblique, the cure is to be attempted by the same operations; but when the side of a tooth inclines forward, it is necessary to use the forceps to bring the part into its right position.

Loosening of the Teeth.—Sometimes the teeth become loose and moveable in their sockets. The proximate cause of this affection may depend upon the loss of the elasticity of the alveoli and gums, upon the too great or too small size of the foyets, or upon the absorption or wasting of the fangs. Loose teeth are very inconvenient in mastication, and easily drop out.

Of this complaint there are several species, the differences of which are referrible to the causes.

1. Loosening of the teeth from second dentition. After the seventh year, the twenty milk-teeth begin to grow loose, and fall out, nearly in the same order in which they were cut.

2. Loosening of the teeth from age. In old persons the sockets become contracted, and the canal in the fangs being obliterated, these parts also diminish. Hence we see the reason why the teeth frequently become loose in subjects advanced in life.

3. Loosening of the teeth from violent concussions. A forcible concussion, such as happens in falls against the teeth, diminishes the elasticity of the gums and sockets, and of course may be a cause of the present disorder.

The cure requires corroborative washes: the tinctura laccis, astringent decoctions, red wine, spirit of wine, or the terra catechu or fanguis draconis, dissolved in camphorated spirit.

4. Loosening of the teeth from relaxation of the gums. There are people whose gums are pale and relaxed, at the same time that there is no appearance of fevry.

The cure is to be accomplished by the means recommended for the preceding case:

5. Loosening of the teeth either from caries of the focket or fang. This case may be known by the emission of pus from the socket of the loose tooth. Sometimes a cure may be effected by gaggles; but, in general, if the tooth is also painful, it ought to be extracted.

6. Loosening of the teeth from feyry of the gums. In subjects with fevry, the gums become loose and fungous, and the sockets filled with a fetid purulent matter: hence the teeth are loosened.

The cure requires the internal exhibition of antiscorbutic medicines, and the use of antiscorbutic washes.

7. Loosening of the teeth from mercury. Mercury acts specifically upon the gums, destroying their tone, and promoting the secretion of saliva. Hence, persons using mercury, either outwardly or inwardly, are liable to have their teeth rendered loose.

The cure demands purgative medicines, the expulsion of the mercury from the fylfem, and the use of tonic gaggles.

Defect of Teeth. When the teeth are entirely wanting, several very unpleasant effects are necessarily the consequence. The proper mastication of the food being then absolutely impossible, cardialgia, and other complaints connected with difficult digestion, are produced. The deficiency of the grinding teeth occasions a collapse of the cheeks, and of course an unlightened emanation of the countenance; while the want of the incisors spoils the voice.

1. It is natural for all young infants to be without teeth, until they are seven or eight months old; but when the teeth do not begin to come through the gums after a child is a twelvemonth old, then the backwardness of dentition may be considered as morbid.

2. In old perons, the teeth naturally fall out, and the alveoli contract into a kind of sharp edge, covered with the callous membrane of the gums, by which the softer species of food may yet be chewed.

3. Want of teeth from rickets. When the rudiments of the permanent teeth are destroyed with the milk-teeth, then of course no secondary teeth ever make their appearance.

4. Loofs of teeth from violent caufes. Under this head we comprehend the defect of one or several teeth, drawn, or beaten out.

5. Loofs of teeth from necrosis. Every form of this disorder makes the teeth fall out in little pieces.

6. Loofs of teeth from sevry. In situations where the sevry is prevalent, it is common to meet with numerous perons who have lost their teeth in the very prine of life. Every kind of deficiency of teeth, except that which belongs to infancy, cannot be remedied in any other way but by the insertion either of artificial or natural teeth.

Of the Infection of Teeth. There are various species of this operation, but all of which may be included under the following heads.

1. The infection of a healthy proper tooth. When a tooth that has been extracted, or beaten out, appears to be entirely found, it is to be immediately replaced in the focket, and tied with thread to the adjacent teeth. Sometimes it spon-
spontaneously becomes fixed again, if care be taken to use an astringent gargle with a view of making the gum contract.

2. The infiltration of a proper tooth that has a carious fang. When the tooth, which has been removed from the alveoli, is merely carious in the fang, it may be replaced again, after the carious part has been filed away.

3. The infiltration of a proper tooth, which has a caries of its body or crown. When a very small portion of the crown is carious, it may be removed with a file, and the tooth can then be put into its socket again. But if the whole body be decayed, it may be cut off transversely from the root; a small hole may be drilled across the latter part, and, with the help of a golden wire, an artificial crown or body, having also a transverse hole for the passage of the wire, may be fastened to the root. In this flat, the tooth may be replaced.

4. The infiltration of a tooth taken from the mouth of another living subject, or from a dead subject. The person, to whom the tooth is to be transferred, should not be above the age of forty; but the subject, from whom it is to be taken, ought not to be more than four-and-twenty. The transplanted tooth should belong to the same jaw and side of the face, and be of the same shape and size, as the tooth that is extracted.

The canal of the tooth, which is to be infiltrated, must be closed with gold; and the tooth must be every where rendered free from inequalities, so that it may be the more likely to adhere.

5. The infiltration of an artificial tooth. The form and size which should be given to the artificial tooth must be determined by a model of soft red wax, which has been pressed into the gap made by the loft tooth. In order that the white colour of the artificial tooth may correspond to the light yellowish colour of the root of the teeth, the new tooth should be macerated in strong coffee, or in the lees of red wine.

Artificial teeth ought to be made of ivory, or of the tooth of the hippopotamus. Each of them should be grooved on both sides, and perforated transversely, so as to admit of being tied to the neighbouring teeth. The nooses of two threads are to be fastened on the neighbouring teeth, and the ends having been drawn transversely through the hole of the artificial tooth, and there made to encircle, they are to be tied in a surgeon's knot. The tooth having been placed in the socket, the threads between the artificial and old teeth must be tightened and made fast. Lastly, an astringent gargle must be used for a few days.

6. The infiltration of several artificial teeth. When two, three, or a larger number of contiguous teeth are wanting, an equal number must be formed of one piece of ivory, or other substance, and fastened at once to the neighbouring teeth.

7. The infiltration of a whole set of artificial teeth. When all the teeth of the upper and lower jaws are lost, a complete set may be fixed on the margins of the alveolar arches. Should any of the natural teeth remain, they may often be of great assistance, in rendering the lodgment of the artificial ones more firm and secure. When the whole, or the greater part, of the teeth of either jaw is lost, an artificial set may also be infiltrated.

The custom of wearing ivory teeth, and of binding them in with a gold wire, is very ancient: Lucian and Martial speak of it as practised among the Romans. But ligatures of wire have been found to hurt the natural teeth, with which the artificial are connected; whereas filken twist cannot affect them to any considerable degree for several years.

Guilleman gives us the composition of a pate for making artificial teeth, which will never grow yellow: the composition is white wax granulated, and melted with a little gum elemi, adding powder of white mastic, coral, and pearl.

Thus whole sets may be made for one or both jaws, so well fitted to admit of the necessary motions, and so conveniently retained in their proper situation, by means of springs, that they will answer every purpose of natural teeth, and may be taken out, cleaned, and replaced by the patient himself with great ease.

Wearing out of the Enamel.—(See Cranum.) The bodies of the grinding teeth being wide, excessively hard, and exposed to perpetual friction, they become worn much sooner than the rest of the teeth, and flat in consequence of the destruction of their points. Halleri Element. Phystol. 1. vi. p. 29.

With respect to the effects of the loss of the enamel, it is to be observed, that the teeth which are deprived of it become so vulnerable, that painful sensations are produced in them by heat and cold, and by solid as well as liquid aliment. In the end, also, they readily become carious.

The species of this affection depend upon the causes.

1. Loss of the enamel from age. After the age of thirty, almost all the teeth in the human subject have been somewhat worn by long mastication. Some writers assert, that in youth, the walls of the enamel may be repaired by nature; but if the teeth be defective in vascularity, the evil must be always irreparable. See Cranum.

2. Loss of the enamel from gnawing of the teeth. Persons who in the night are in the habit of gnawing their teeth destroy the enamel. For the purpose of preventing the ill consequences of this practice, it has even been recommended to cover the teeth in the night-time with a thin gold plate.

3. Destruction of the enamel by the use of tobacco-pipes. Plenck informs us, that in the incisor teeth of men, who had for many years been accustomed to smoke pipes, he has seen the distinct impression of a black fumicircle.

4. Loss of the enamel from long and violent brushing of the teeth. They who daily rub and brush their teeth forcibly with a rough hard tooth-powder, or too stiff a brush, inevitably destroy, in the course of a few years, all the enamel on the front surface of the teeth. Here the cure obviously depends upon the avoidance of the cause.

5. Loss of the enamel from applying the file to the teeth. Whenever this operation is carried to too considerable a depth, the enamel is removed by mechanical violence.

6. Loss of the enamel from biting a very hard body. This fort of violence sometimes splits the enamel, which immediately falls off in pieces, at the very time of making the bite.

7. Loss of the enamel from its being preternaturally brittle. When the enamel is thus affected, it is apt to break in chewing and biting substances without the exertion of any particular degree of force.

8. Loss of the enamel from the projection of an opposite tooth. A tooth which juts out considerably, so wears the corresponding tooth in the opposite jaw, as to make a deep impression in it. The treatment consists in shortening the tooth, which is injurious on account of its length, with a file.

Concretion of several of the Teeth into one Mass.—A true ankylosis of the teeth cannot happen from any process like ossification, because they pollish no vascularity; and some of the cafes, referred to by writers, were probably original malformation.

There are several varieties specified.
TEETH.

1. The true concretion of the teeth, which happens when the teeth are connected together by a substance resembling bone.

2. The sputious concretion, or that arising from the excrise cloveneufs of the teeth to each other, in which flate they feed as if they had actually grown together.

3. The concretion from tartar. Sometimes the interpaces of the teeth are so filled up with tartar, that the teeth con-
here in such a degree, as to cause an appearance resembling what may be supposed to proceed from an actual honey con-
cretion of those bodies. The mode of treating this case will be considered in speaking of the tartar of the teeth.

4. The close contact of the fang of the tooth with the socket. In this circumfance, the tooth either cannot be ex-
tracted, or, in the event of great force being used, the tooth is broken away from the jaw.

Elongation of the Teeth.—Sometimes one or more of the teeth appear to become longer.

1. Elongation of a tooth from the deficiency of the opposite one. Thus, when one of the molar of the upper jaw is drawn out, the corresponding tooth of the lower jaw seems lengthened; because after a time the neighbouring teeth are worn down by friction which they continually exercise against each other.

2. Elongation from preternatural softness of the tooth. Pleinek informs us, that he has seen in a female child eight years old, the right canine tooth of the lower jaw elongated, and which, after being extracted, was found so soft, that the crown and fang could be compressed with the finger.

3. Elongation of a tooth from excessive growth is men-
tioned by writers; but this case cannot be possible, as the teeth are known not to be vascular.

4. Imaginary elongation. Perfons whose teeth are affected with dolor, are apt to fancy that their teeth are longer than natural; but without real cause. The cure con-
fronts in removing the dolor.

Foulnefs of the Teeth.—The teeth are often seen covered with a forbid, crusty, yellowish, or dark-brown mucun.

The proximate cause is the adhesion of the mucus of the mouth and fanaes to the surface of the teeth.

1. Morning foulnefs. In almost all men, the teeth become coated in the night during sleep with a dirty mucun, and appear fowl in the morning. The reason is, because during sleep the saliva is more floavly secreted in the mouth; and, on account of the motion of the tongue and jaws, it is not washed off the teeth.

This species of foulnefs is easily removed by washing the mouths every day with cold water, and the teeth with a bit of rag, the finger, or a wet sponge.

2. Foulnefs of the teeth from neglect to clean them. They who are not in the daily habit of washing their mouths and teeth with cold water, by degrees have the intertineflees and fangs of their teeth incrusted with mucus in the morning, and with the remaining particles of the food.

With respect to the treatment, merely washing the mouth in this infince is not enough; it is alfo requisite to clean the teeth occasionally with tooth-powder.

3. Foulnefs of the teeth from fever. This is remarkably seen in cafes of putrid fever, in which, owing to the flate of the saliva, the teeth become covered with a yellow or dark-brown coat.

Here the teeth should be frequently washed and cleaned with vinegar.

4. Foulnefs from ptyalism, especially that produced by mercury. In the beginning of a salivation, the teeth become coated with mucus. The best treatment is to wash and clean them frequently with a honey garge.

5. Scorbutic foulnefs. In perfons labouring under scurvy, the teeth are invariably covered with a purulent kind of mucus, issuing from the fockets of the boiled fangs.

The cure demands the internal and external employment of anti-scorbutic remedies.

6. Foulnefs of the teeth from tartar. In the early state of the formation of tartar, the surface of the teeth becomes covered with a mixture of earth and glutin.

The treatment consists in removing the tartar with a thick tooth-powder.

Of cleaning the Teeth.—In perfons whose teeth are perfectly found, it is only neceffary to wash their mouths every morning with water that has had the chill taken off it, and that contains a few drops of the spirit of lavender; the mucus being wiped from the teeth with a bit of rag, or sponge. The fame should alfo be done after meals, and the fragments of meat lofled between the teeth must be removed with a tooth-
pick, which instrumt fome recommend to be made of juniper wood.

But in perfons in whom a depofition of tartar readily takes place, the tartar ought to be removed with a tooth-
scraper, and the teeth well cleaned every week with tooth-
powder.

Charcoal, or carbon, is used for cleaning the teeth, and the biff is made from the shell of the cocoanut. We are informed by historians that the ladies among the ancient Britons ufed the charcoal made with the wood of the common hazel-nut for this purpose. See DENTIFRICE.

The absorbent earths are ufed for dentifrices; they me-
chanically cleanse the teeth from the thick mucus and tartar, and at the fame time preferve the tone of the gums. Therefore,

1. The basis of dentifrice powders may be prepared from shells, red corals, mother-of-pearl, powdered crabs' claws, bone of the cattle-fish, lapis laznittites, &c.

2. For communicating an agreeable colour to the pow-
der, carmine or cochineal may be added.

3. For giving an agreeable odour, ambergris, cinnamon, or cloves may be ufed.

4. For strengthening the gums, armenian bole, fanguinis, or terra cethus, is the biff ingredient.

Rough tooth-powders, like that containing pumice-stone, gradually wear away the enamel, especially when they are employed every day.

Acid applications, particularly the mineral ones, do in-
deed whiten the teeth; but when long ufed, render them brittle.

Hence crude and burnt alum ought to be rejected from every kind of dentifrice. The nitric, muriatic, and sulphuric acids in tinctures are still more hurtful.

Of the Tartar of the Teeth.—This substance is an earthy crufet, which adheres to the teeth. As it fills up the inter-
paces of several of the teeth, and occupies their external surfaces, it is seldom observed upon their inside. By the Greeks it was called odontolithes, from odon, a tooth, and lithos, a stone. By others it has been termed taphus, vel calcis dentum.

With regard to the effects of the tartar, it displaces the teeth, and renders them loffe and painful; it alfo separates the gums from the fangs, producing caries in the latter, and a bad smell in the breath.

In refpect to colour, the tartar of the teeth is of three kinds, namely, dark-brown, yellow, and black.

Since many perfons who never clean their teeth at all are not disunited with the depofitions of tartar, it appears that a peculiar dispo fition cafe is neceffary for the occurrence of the complaint. The species are:

1. Tartar
TEETH.

1. Tartar from neglect to wash the mouth. It originates from the gluten of the saliva, which, in uncleanly scorbutic subjects, and great wine-drinkers, adheres to the teeth, becomes putrid with the heat, and in putrefying deposits a fort of earthy matter upon the teeth. People who drink chiefly water are seldom troubled with earthy incrustations on their teeth.

The cure requires the removal of the tartar. Small portions of tartar may be taken off by means of a brush and a thickish tooth-powder.

But when the tartar is abundant, thick, and grown, as it were, to the teeth, it must be cut with a suitable instrument placed obliquely, beginning from the neck, and carrying the instrument towards the upper part of the tooth. The tartar having been cut, is then to be removed piecemeal.

Any remaining particles of tartar may afterwards be gradually got rid of by the use of a brush and tooth-powder.

2. Spontaneous tartar. There are certain persons, whose teeth are constantly incrusted with tartar, notwithstanding they are in the continual habit of washing their teeth and mouths.

This peculiar disease seems to consist in an extraordinary quantity of earthy matter in the saliva.

Berdmore relates a surprizing example of this fort of tartar. A man, thirty-two years of age, had the teeth of each jaw coated with solid tartar, half an inch in thickness, both on the outside and inside of the teeth, and on the surface of the gums, so that the interlaces of the teeth were altogether invisible. The gums were every where pushed off the teeth, and painful. The incrustations upon the incisor teeth were so thick, that the lower lip was rendered more prominent. During a fortnight, Berdmore removed every day some of the tartar from the teeth with an instrument, and at length employed a dentifrice and brush. The retracted gums were scarified, and thus made to adhere to the necks of the teeth. The patient was obliged to brush his gums and teeth three times a day, partly with a view of preventing the new formation of tartar, and partly in order that the regeneration of the gums might be still more promoted. But although the patient strictly followed this plan, his teeth and gums, in the course of half a year, became again covered with an extremely thick coat of tartar. Berdmore was therefore under the necessity of recommending the use of a stifler brush, and a dentifrice made of shells, for the purpose of removing the tartar. P. 56.

With respect to the treatment of tartarous incrustations of the teeth in general, it is essential to remove the tartar and clean the teeth well every day.

The internal and external remedies also, which are usually advised for dissolving stones in the bladder, may be employed, as lime-water, pure potash, &c.

Sometimes peppermint-water, with a few drops of nitrous acid, is used with advantage.

3. Tartar from the porosity of the surface of the teeth. Persons who are in the habit of using acid tinctures or powders which disfigure the enamel, and make it porous, are frequently troubled with tartarous incrustations.

The cause being avoided, the mode of treatment is the same as in the preceding cases.

Of Blacknefs or Necrosis of the Teeth.—This is a very peculiar affection of all the teeth, making them appear black, rough, and eroded.

Sometimes only the upper part of the crown exhibits a dark-coloured erosion; while, in other instances, the whole substance of the tooth is eroded.

The proximate cause of this disease is imputed by Pienck to injury of the nutrient vessels of the pulp by disease, before the growth of the tooth is thoroughly completed; and, therefore, it is a totally different disorder from necroses of the bones, which is attended with phenomena, connected with the vascularity of the parts themselves.

Hence it is only in infants that several of the teeth are usually thus disfigured.

Necroses of the milk-teeth is indeed much more frequent than of the permanent set.

The following varieties of the complaint, depending on the difference of the cause, have been distinguished.

1. Blacknefs of the teeth from rachitis. In rickety infants, the milk-teeth come out of the jaw more tardily, and they soon afterwards turn black and friable, and fall out piecemeal. The secondary teeth also, when rachitis is not cured between the first and second dentition, are affected with the same destructive change, so that subjects of this description are either destitute of teeth during the whole of their lives, or only have in their mouths teeth which have a black eroded appearance.

As for the cure of rachitis, we do not intend to consider it in the present place, and shall merely state that the pure milk of a healthy nurse, palatable airs, a great deal of exercise, good food, absorbent medicines, white alkaline salts, bark, feel, sea-bathing, &c. are the remedies principally recommended.

2. Scorbutic blacknefs of the teeth. When the scurvy attacks children before the ossification of the teeth is completed, the milk-teeth, as soon as cut, either appear to be already eroded, or in a short time afterwards become fo, and put on a black colour.

The cure demands the immediate exhibition of anti-scorbutic medicines, with the assistance of which the second teeth are sometimes perfectly healthy.

3. Blacknefs of the teeth from the small-pox. In children who are seized with malignant small-pox during the first or second dentition, a black erosion of the teeth is frequently observed.

The cure requires the repeated administration of purgatives, and then the Peruvian bark.

4. Blacknefs of the teeth from measles. The same black erosion of the teeth has been remarked after severe cures of measles.

The cure is the same as in the foregoing instance.

All the preceding species of necroses, when they affect the milk-teeth, are to be stopped by their proper specific remedies, in order that the second set of teeth may not be affected; but when these are disordered, the cure is irremediable.

5. Blacknefs of the teeth from tartar. The tartar itself sometimes turns black, and even after its removal, the teeth often remain of a blackish colour, which cannot be effaced.

6. Blacknefs of the teeth from the application of mineral acids. Nitrous acid diluted with water, in a short time, whitens the teeth; but soon afterwards renders them black and friable. Plenck has seen the lateral edges of the teeth turned black and corroded by the employment of mercurial cosmeties.

7. Blacknefs of the teeth from cancer. Plenck has twice noticed in men, who were afflicted with ulcerated cancers of the lower lip, the teeth disfigured with a deep black colour. But it is to be remarked, that the affection was confined to the enamel, and did not extend to the bony substance of the fangs.

Preternatural Colour of the Teeth.—This is a change of the natural colour of the teeth to a yellow or ash-colour.

1. Discolouration from neglect, to clean the teeth. The
Dilcolouration

Teeth.

1. The scurvy, the bodies of the teeth by degrees become so fragile that they drop out piece meal.
2. Fragility from rickets. In children thus affected, the milk-teeth, soon after they have been cut, become dark-coloured, are easily broken, and usually fall out in pieces.
3. Fragility from old age. In old age the teeth are apt to be broken in biting with force, and to fall out piece meal.
4. Fragility from the application of mineral acids or burning oils. The abuse of such medicines, too long continued, brings on a species of fragility, which admits of no mode of cure.
5. Fragility from caries. Teeth, which are excavated by caries, and rendered thin, are readily broken in mastication, and drop out in pieces.

All the different species of fragility are incurable.

Mollite, or Preternatural Softness of the Teeth.—This disease is so remarkable a softness of the substance of the teeth, that it can almost be compressed together by the fingers.

The proximate cause is said to be either too great a quantity of the gluten, which connects the earthy particles together, or else a deficiency of the earth.

The species are:
1. Softness of a milk-tooth. Plenck extracted from a girl seven years of age, a canine milk-tooth of the lower jaw, which was livid and soft, like cartilage, and was compressible by the fingers, especially at the fang. De Morb. Dentium, p. 39.
2. Softness of the teeth from farcoholis of the fang. Sometimes the fang of a tooth is absorbed, and a fungous substance fills its place. This case has been absurdly flnallised as a specimen of mollities of the teeth.
3. Softness of the teeth from scurvy. It is affirmed, that in the scurvy, the teeth have been sometimes softened and enlarged. (Granger Hil. Febris Anom. p. 6.) But such accounts must be incorrect, since they imply a vascular organization of the teeth. It merits attention also, that in certain dead subjects, whose bones are all affected with mollities, the teeth are found perfectly hard.

Preternatural Angle, or Sharpness of the Teeth.—Sometimes the form of a tooth is so acute, that it hurts the neighbouring parts by pricking them.

The effects of such a tooth are irritation of the tongue, or of the inner surface of the lips, or cheek. Hence inflammation of these parts, or an ill-conditioned ulcer opposite the sharp portion of the tooth, curable by no means whatsoever, except the removal of the angle or sharpness.

The species are as follows:
1. Irritating angles, or sharpnesses from malformation of a tooth. In this case the tooth has a found appearance, and the crown is felt to be too pointed or sharp.
2. Irritating angles, or sharpnesses from an oblique fracture of a tooth, as sometimes happens from biting hard nuts and other substances. The case can be detected on ocular examination.
3. Irritating angles, or sharpnesses from the tooth being worn obliquely. This is the most common case.

The cure requires that the pointed or sharp part of the tooth be removed either with a file or a pair of cutting forceps; but if this cannot be accomplished, the tooth should be pulled out.

Fractures of the Teeth.—A fracture of a tooth is a solution of it into two or more fragments.

The solution of continuity may be transverse, oblique, or comminuted. The most common kind of fracture is the separation of a particle of the enamel from the root.

Vol. XXXV.
The effects are, considerable pain in the tooth, and sometimes convulsions; an unpleasant sensation in the tongue upon its touching the fracture. An oblique fracture hurts the tongue, lips, or cheek, by its pointed form. The broken surface of a tooth not unfrequently becomes carious.

The species are:

1. Fracture from violence; as occurs in a fall upon the teeth, a blow on them, or in biting the hard stones of fruits, or in an imperfect extraction of a tooth.

2. Fracture from previous caries, or fragility of a tooth. When either of these causes is present, a very considerable force will break the tooth, and split it into several pieces. The surface of the fractured part ought to be kept covered for several days with malleat.

The fracture of a tooth is an incurable accident.

Fractures of the Teeth.—A fracture of a tooth means a solution of continuity, like a mere line, or a crack in the enamel.

For the most part, the cause originates from biting the stones of fruit, or other hard substances. The effects are pain and tenderness of the tooth, and, in consequence of the entrance of fords into the fissure, caries is frequently produced.

The treatment consists in filling up the fissure, while recent, with gum malleat.

Laxations of the Teeth.—The laxation of a tooth means the displacement of it from its natural position in the socket, occasioned by violence.

The causes are biting hard or refilling bodies with extreme force; falls or blows upon the teeth; but, most commonly, the accident is brought on by an imperfect and unsuccessful attempt to draw a tooth. The disfigurement, arising from the wrong posture of the tooth, is the chief effect. The tooth may be put into its right position again with the aid of a pair of forceps.

Stupor of the Teeth.—This is a very singular sensation in the teeth, which cannot be described by words. It was called by the Greeks ἐκσφέξις, from σφέξ, obsfipes; the French term it l'agacement des dents.

The proximate cause is a peculiar affection of the nerves of the teeth.

With regard to the effects, this annoying sensation prevents mastication, and excites a preternatural secretion of the saliva; while it is exasperated by the entrance of air into the cavity of the mouth. For the most part, the complaint is only of a transient nature.

The species are:

1. Stupor of the teeth from eating unripe fruit. Hence we find, the affection is often caused by eating four cherries, currants, gooseberries, &c.

This can may be relieved by chewing sweet almonds, or applying fomentations to the teeth.

2. Stupor of the teeth from vomiting dark bilious matter from the stomach. The secretions thrown up from the stomach are sometimes of an astringent kind, and therefore may give rise to this affection of the teeth. Plenck has many times noticed the occurrence in hypochondriacal subjects. Doctrina de Morb. Dentium, p. 42.

The cure demands emetics and absorbents, or mild alkaline remedies.

3. Stupor of the teeth in ricketsy subjects. The teeth of persons who labour under rachitis, are, on account of their greater sensibility, particularly exposed to the attack of this complaint.

It forms the radical cure of rachitis, which is to be attempted by tonic and absorbent medicines, external palliative means are not to be omitted.

4. Stupor of the teeth from harsh noises. Thus the pain-
the existence of the usual symptoms of the scurvy. In addition to an intolerable itching in the gums, very acute pain is also often experienced.

With respect to the cure, topical remedies must be employed, together with such external and internal medicines as are generally requisite for the scurvy.

7. Odontalgia gastrica is an acute pain in the teeth and gums, arising from a wrong state of the prime vac. It may be cured by emetics, purgatives, and other medicines calculated to put the bowels and stomach into order again.

Odontalgia gastrica-verminosa. People who have worms are frequently tormented with the tooth-ache. Authors attempt to explain the fact as follows: they state that worms in the intestines irritate the great intercostal nerve, which has a strong sympathetic connection with the nerves of the teeth.

The cure demands purgatives and anthelmintic remedies.

8. Odontalgia ventriculi debilitate, feb irritabilitate. It sometimes happens that men and hysterical women, whose stomachs are weak and irritable, are afflicted with excruciating tooth-aches, which yield to no remedies but antispasmodics, tonics, and tonics.

9. Odontalgia gravidarum. In the tooth-ache originating from pregnancy, the pain often shifts from one tooth to another, and comes on very repeatedly, although the teeth are frequently perfectly sound. Sometimes the pain is merely sympathetic; but, in most instances, it is connected with that plethoric state of the female constitution known to prevail during pregnancy. Venefection is, therefore, the chief means of relief, and then topical applications may be used.

It is a question, whether the operation of drawing a tooth should ever be performed on pregnant women. There are some women who have such a dread of the instruments for this purpose, that the very sight of them brings on the danger of convulsions and miscarriage. But, on the other hand, the pain may be too violent as to create a chance of the same evils. Here much address is requisite to persuade the patient to undergo the operation, and at the same time great prudence not to advise it, unless rendered absolutely indispensible by the severity and obscurity of the pain.

10. Odontalgia nutricum. Women who suckle are also particularly subject to be afflicted with excruciating tooth-ache, whether the teeth be found or carious. When the pain refits the usual means, especially opium and venefaction, the tooth must be extracted. This case has been supposed to depend upon a certain sympathy between the mammae and the teeth.

11. Odontalgia from cutting the dens fapientiae. Sometimes great and long-continued pain, delirium, and other alarming symptoms take place, until the tooth has made its way out, or the gums have been divided.

12. Odontalgia hysterica. This species of tooth-ache often afflicts hysterical women a long while, notwithstanding the teeth may be perfectly healthy; nor does it always yield to opium, nor even to the operation of extracting several of the painful teeth.

The treatment requires the warm bath, emollient fomentations to the cheeks, and gargles of the same quality to the mouth.

13. Odontalgia from the teeth being worn away. The bony substance of the teeth is so sensible, when deprived of the enamel, that on coming into contact with air, or food, at all too warm, or cold, the most intolerable pain is excited.

14. Odontalgia from tartar on the teeth. The tartar separates the gums from the neck and fang of the tooth, so as to expose the latter parts to the cold air, and the stimulating quality of the food. Hence, it is obvious, pain must be the consequence.

The radical cure can only be accomplished by removing the tartar. The complaint may be palliated by the common applications for the relief of tooth-ache.

15. Odontalgia from a fracture of the body of the tooth. In this case the nerves of the remaining portion of the tooth are exposed to the air, and sometimes become affected with extreme pain.

Writers recommend for the purpose of relieving this complaint, either applying the cautery to the surface of the fractured tooth, or else covering it with wax, or gum mastic.

16. Odontalgia verminosa. Whether the tooth-ache can ever really arise from the presence of worms in a carious tooth, is doubtful. Planch thick conceives the occurrence possible, and he propages as a means of cure the employment of a gargoyle containing the mariattes of ammonia and soda.

17. Odontalgia periodica signifies that form of the tooth-ache, which comes on every other day, and resembles in its periods of attack an intermittent fever.

In the treatment, authors recommend the use of purgatives, emetics, and the Peruvian bark.

18. Odontalgia cariosa. It is not every fort of caries of the teeth which is accompanied with pain; but only the internal or external humed kind of caries. In the dry caries, and also in the humid, when all the nervous filaments of the bone of the tooth have been destroyed by it, the carious tooth remains free from pain.

In the tooth-ache from caries, the following modes of relief are recommended:

1. Prefigrate upon the nerve which comes out of the infra-ordinary canal of the superior maxillary bone.
2. Prefigrate upon the nerve which passes out of the canal mentalis of the lower jaw-bone.
3. Sulphuric acid applied to the carious part of the tooth by means of a probe. Planch has sometimes found this plan useful.
4. Vinum pyrethri, vel ruteae, or strong vinegar.
5. Sinapisms to the cheek.
6. Blisters to the nape of the neck, and behind the ears.
7. The application of a magnet to the painful tooth.
8. Oil of cloves introduced into the carious tooth.
9. Camphorated milk retained for a time in the mouth.
10. Burning the nerve with a heated probe.
11. Opium applied to the carious tooth, or administered internally.
12. Luxating the painful tooth is another mode of relief which has been proposed. With the aid of a suitable instrument the tooth is to be turned a little round in its socket, and then turned back again into its natural position. Thus, the small nerve, which enters the hole in the fang, is either broken or rendered paralytic.

Caries of the Teeth.—This signifies an erosion of the substance of the teeth.

The dentes molares are more frequently than the rest of the teeth affected with caries, and the dentes fapientiae oftener than any of the other grinders.

Caries of the teeth varies in respect to its situation, figure, nature, and cause.

In regard to situation, the caries may take place in one, in several, or in all the teeth. It may occur upon the external
The internal causes are febrile, rachitis, scrofula, &c.

In relation to the particular nature of caries of the teeth, there are two species; one termed humid, which quickly destroys the tooth affected with it; the other is the dry caries, which advances slowly, leaves a long while, is altogether indolent, and cannot be palliated by any known remedy.

The effects of caries are feter of the breath; repeated attacks of tooth-ache; infection of the neighbouring teeth; and not unfrequently the corresponding tooth on the opposite side of the mouth becomes also affected with caries, as several authors whimsically suppose, from nervous sympathy. In the situation of the diseased tooth, especially over the carious fang, the gum is most commonly attacked with a parulis, or epulis. Sometimes chronic ophtalmia originates from the irritation of the diseased fang (Journ. de Méd. tom. xxxvi.); or else a fistula of the gums or cheek, or an ozana of the antrum Highmorianum. Even a locked-jaw has been known to arise from carious teeth. Truka. Com. de Tétuna, p. 151.

In respect to figure or form, the following species of caries may be established:

1. Caries foraminosa, or a carious canal, which runs from the external surface of the crown, and penetrates the substance of the tooth.

In the treatment, it is proper to clean out the carious canal with a needle, and by injecting a fluid into it. Then it is to be burnt with a heated needle; and, lastly, elosed with wax, maltich, gold, or lead.

2. Caries of the whole crown or body of a tooth. When the middle of the crown of a tooth is eroded in such a manner, that the caries is wider superficially than it is more deeply, then the gold, or lead, or whatever is used for filling it up, cannot be retained in its place.

In this circumstance it becomes necessary to burn the carious surface with the suitable instrument; or to deftroy it with caustic applications; or to apply antifeptics.

But when, notwithstanding all these means, the caries yet spreads, the tooth ought to be extracted, in order to remove the pain, prevent the occurrence of other diseasces, and not incur the risk of the tooth breaking in pieces in the attempt to take it out at a later period, when it may be evacuated and rendered too thin.

3. Caries maculosa. If the superficial spot only appear upon the external surface of the tooth, it may be removed with a file.

4. Caries fibrata. When the caries occurs in the form of a longitudinal black streak, it is either in the middle of the crown, or on the lateral margins of the tooth. This cæse may be occasioned by the teeth being placed too closely together, and also by the use of cosmetics. It admits of being taken off with a file.

5. Caries of the fang of a tooth. The body of such a tooth is sometimes found. The tooth, however, is frequently painful, the check of the affected fide, and the gum near the painful tooth swell, and an abscess is formed, which is less common in the other species of caries.

The cure requires that the tooth should be drawn out as soon as the inflammation has subsided, it is reckoned dangerous to perform the operation while the parts are much inflamed.

6. Internal caries of a tooth. In this complaint the tooth is painful, and exhibits a leaden colour, and if it be shaken with an instrument the pain is considerab]ly extinguished. Thus the diseased tooth may be detected amongst many which are healthy, even when several of them are thought by the patient to be unford.

The cure requires the tooth to be extracted.

7. Caries of all the teeth. This affliction is sometimes induced by the febrile, and rachitis. The radical cure is of course impossible; but the progress of the caries can be checked by the internal use of antifcorbic medicines, the remedies against rachitis, and by giving asa-fetida.

Externally, antifeptic washes may be useful.

Plumbato dentis is the filling of the carious cavity with thin sheet-lead, tin, or gold. Gold is preferable to lead, which is apt to be acted upon and dissolved by acid food, and may therefore produce the fatunrise colic; but, on the other hand, lead is more easily introduced into the tooth, and it can be more firmly fixed there. Some dentists give the preference to tin.

The operation is proper, if the carious tooth has a narrow entrance. It can only be performed on the incisors, canine teeth, and first grinders, which are furnished with but one fang.

The operation is contraindicated, when the orifice of the carious is wider than its bottom, as the lead cannot then be retained. Also, when pain and inflammation are present, the introduction of the lead must be deferred until these symptoms have subsided.

The instruments for this operation are,

1. The introducer.
2. The perforator.
3. The planatorium.
4. The file.
5. The plates or leaves of gold, about three or four times as thick as those commonly met with.

As for the operation itself, A thin plate of lead, tin, or gold, is to be put into the hollow of the tooth, by means of the instrument called the introducer.

2. The lead or gold is to be gradually compressed more and more closely, so that it may fill up well the sides of the cavity. This is to be done with the planatorium. Then some holes are to be drilled in the metal with the perforator, and these are to be filled with lead. Lastly, the place is to be rendered even and smooth with the file.

The lead, for some days after the operation, proves rather disagreeable to the tongue; but, in a short time, the patient is habituated to it, and he experiences no longer any such inconvenience.

Sometimes pain and inflammation follow; in which case, the lead must be taken out for a few days with a pointed instrument.
TEETH.

There have been persons who have had lead in their teeth seventy years, and upwards, without any annoyance from it.

Of drawing or extracting a Tooth.—We shall conclude this article with a few observations upon the surgical operation of extracting a tooth from its socket.

The following cases make the performance of it necessary.

1. A carious tooth, producing a severe degree of pain, which can be abated by no remedies.
2. A sharp tooth, which irritates and hurts the tongue, and does not admit of being amended with the file.
3. An ulcer, or abscesses of the maxillary sinus.
4. A tooth which renders the socket carious, or causes absceces, or excrences of the gums, fission of the jaw, or some other troublesome complaints.
5. A milk-tooth not being fixed at the usual period, and its presence forcing one of the permanent set to grow in a wrong direction.
6. A tooth growing out of the palate, or in any other unnatural place.

On the other hand, the operation is contraindicated, when the gums are highly inflamed; or when a tooth-ache, excited by mercury, or the feversy, is present. Drawing a tooth, in these circumstances, might give rise to extensive inflammation and angina in a dangerous degree.

The common instruments are,
1. The odontagra.
2. The pelicanus.
3. The clavis, or key.

These three instruments are objectionable in one respect: namely, they pull the tooth out of its socket obliquely; and hence they often break the alveolar procies, or the tooth itself.

But the tooth-instrument which Aitken has described, draws the tooth out of the socket perpendicularly; and, on this account, has an advantage. See Essays on several important Subjects in Surgery, London, 1771, p. 196.

4. The tooth forceps.
5. The pes caprinus, or punch.

The molar, when they can be firmly taken hold of, may be extracted with either of the first four instruments.

The incisors, canini, and first molares, may be drawn out with the forceps.

Stumps and fangs cannot be taken hold of with these instruments; they must, therefore, be pulled out of the alveolar procies with the pes caprinus, or punch, and then be removed with a pair of forceps.

The patient and surgeon are to place themselves as follows.

1. If the tooth be in the upper jaw, and it is to be taken out with the odontagra, pelicanus, or punch; or if the tooth, which is to be drawn, is in the lower jaw, the patient must be seated in a low chair, or on the ground, the surgeon standing behind him.
2. But if the tooth is to be taken out with the key, or from the upper jaw with the forceps, the patient is to sit in a common chair, and the surgeon is to stand in front of him.

The following are the different methods of performing the operation.

1. Of extracting a tooth with the odontagra.

The inner gum of the tooth about to be drawn, is to be depressed with the claw of the instrument nearly down to the alveolar procies. The other part of the instrument is to be applied to the crown of the tooth.

While the thumb is employed in making firm pressure upon the claw, the handle is to be held with the fingers, and, under the direction of the palm, the tooth is to be raised perpendicularly from its socket.

By means of the screw, which admits of being turned, the instrument may readily be adapted to the larger teeth.

2. Of drawing a tooth with the key.

The key is applied to the tooth near or in the same way as the odontagra, except that the thumb of the other hand is placed upon the claw. At the commencement, the key is to be turned very gradually; and the tooth, when it yields, is to be cautiously and slowly raised, left it flip away, and remain adherent to the gum.

3. Of drawing a tooth with the pelicanus.

The claw of this instrument is to be applied to the inside of the neck of the tooth, while the rotula is to be put upon the two neighbouring teeth. The thumb of the hand not holding the instrument is to be applied to the inside of them, so as to counteract the resistance of the rotula.

4. Of the extraction of a tooth with the forceps.

The neck of the tooth being firmly grasped with the forceps, is to be gradually moved, until it is sufficiently loosened to admit of being taken out perpendicularly.

5. Of taking out a tooth with the pes caprinus, or punch.

The two points of the instrument are to be firmly applied, under the gum, to the lower part of the neck of the remaining portion of the tooth. The thumb of the hand not thus employed is to be covered with some linen, and applied internally. The fang is then to be pulled out of the socket, and removed with a pair of forceps.

With regard to the symptoms arising after the operation: a slight hemorrhage, and a swelling of the gums and cheek, are the usual consequences. These, however, are free from danger, and, when the mouth is washed with a gargle of tepid vinegar, they are soon relieved.

The more serious consequences, which sometimes occur after the extraction of a tooth, are,
1. A violent and dangerous degree of hemorrhage.
2. Alarming inflammation of the gums and cheek.
3. Absceses of the gums; very apt to take place, when the gums have been considerably bruised by the instrument, or when splinters of bone are left behind.
4. A fracture of the alveolar procies, or of the palate. This accident is not liable to happen, when the fangs of the teeth diverge, or when the fang and socket have grown together by the process of osification. The existence of the last case may be known by the neck of the tooth being curved. Here the tooth should always be drawn out towards its concave side.

5. Dilation of the jaw. This may occur, if the mouth be too much open, or the lower jaw be brought too much forward, in the operation. The laceration ought to be immediately reduced. See Luxation.
6. Fracture of the jaw. See Fracture.
7. Caries of the socket.
8. Lastly, fracture and laceration of the tooth may be the consequences of an unsuccessful attempt to perform the operation.

In the preceding remarks, we have been chiefly afforded by Plencz's excellent compendium, entitled "Doctura de Morbis Dentium," &c. Lovani, 1796.

Some interesting observations on the diseases of the teeth, particularly with a view to the question whether these parts are susceptible, will be found in the article Cranium.

For a description of the diseases of the gums, we refer to Gumae, Digest of:

A Danish
A Danish physician, named Hagerup, maintains in certain theses that one may hear with the teeth.

As to animals, there are some fishes which have teeth on their tongues, as trouts; others have them at the bottom of the gullet, as the cod-fish; some, as the great sea-dog or shark, called canis cacharias, have three, four, or five rows of teeth on the same jaw; the crocodile three, and those all incisors; vipers have two large crooked canine teeth, which are moveable, and ordinarily lie flat, only being raised when they would bite; and the rana plicatrix, sea-frog, or sea-devil, has whole rows of the like moveable teeth. The tooth and cuttle-fish have no teeth, and yet they can bite. See Anatomy of Fish.

**Teeth, Chemical Analysis of.** The teeth closely resemble bone in their composition. The bodies consist of a cartilaginous basis, united with phosphate of lime, and small proportions of other earthy substances. The enamel differs so far only from the bodies, that it contains no cartilaginous matter, but consists entirely of earthy substances. The teeth have been often examined, and with various results, according to the state of chemical knowledge at the period of examination. We do not think it necessary to give an account of all that has been said on the subject, but shall confine our attention principally to the latest and most perfect analyses. We shall begin with the analysis of Mr. Pepys: he found the enamel of teeth composed of

<table>
<thead>
<tr>
<th></th>
<th>Phosphate of lime</th>
<th>Carbonate of lime</th>
<th>Lofs and water</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teeth of Adults</td>
<td>58</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>Teeth of Children</td>
<td>64</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>62</td>
<td>12</td>
<td>100</td>
</tr>
</tbody>
</table>

The bodies of the teeth, according to the same chemist, consist of the following proportions.

A much more complete analysis, however, of the enamel of teeth has lately been made by Berzelius. He gives the following table of his results, compared with the composition of the bones of the same animals.

<table>
<thead>
<tr>
<th></th>
<th>Dried Human Bones</th>
<th>Enamel of Human Teeth</th>
<th>Bones of Oxen</th>
<th>Enamel of Ox Teeth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cartilage</td>
<td>32.17</td>
<td>1.13</td>
<td>33.5:30</td>
<td>3.56</td>
</tr>
<tr>
<td>Blood-velwels</td>
<td>1.13</td>
<td>2.00</td>
<td>3.5:2.50</td>
<td>4.00</td>
</tr>
<tr>
<td>Fluate of lime</td>
<td>51.0:4</td>
<td>85:3</td>
<td>58:85</td>
<td>81:00</td>
</tr>
<tr>
<td>Phosphate of lime</td>
<td>11.30</td>
<td>8:6</td>
<td>3:85</td>
<td>7:10</td>
</tr>
<tr>
<td>Carbonate of lime</td>
<td>1.16</td>
<td>1.5</td>
<td>2:05</td>
<td>3:00</td>
</tr>
<tr>
<td>Phosphate of magnesia</td>
<td>2.00</td>
<td>2.0</td>
<td>2:45</td>
<td>1:34</td>
</tr>
</tbody>
</table>

Thus confirming a discovery made many years before by Morichini, an Italian chemist, namely, that the enamel of teeth contains fluoric acid; a circumstance which had been called in question by later inquirers.

Food and bone have been found by Fourcroy and Vanquelin to retain proportions of animal matter, varying from 45 to 15 per cent.; a curious fact, and highly illustrative of the powers of intimate mixture, or rather perhaps chemical union, in preventing the destruction of organic substances.

**Teeth, Artificial,** are those set in lieu of natural ones, which are wanting. See Teeth, Disfigur'd of.

**Teeth, Mark of in the Manse.** See Mark and Eye of a Bead. See also Teeth, infra.

**Teeth of Fish.** See Anatomy of Fish.

**Teeth, in Rural Economy,** little bones fixed in the jaws, which serve not only to reduce the food and nourish, but also the age in some animals. The horse has forty teeth, including the tufles, which are thus distinguished. Twenty-four are called grinders, being placed at the bottom of the mouth, beyond the bars, twelve on each side of the channel, viz. six above, and six below; and these change and eat, to give place to others; which, in process of time, become long, large, and yellowish.

These new teeth are distinguished by different names given them, according to their putting forth; and it is the manner of their coming forth that gives the knowledge of the first years of a horse's age.

Of these twelve, four are called nippers, four middle teeth, and four go by the name of corner teeth. The four nippers are seated on the fore-part of the mouth, two above, and two below. When a horse has put forth these, he is concluded to be from two and a half to three years old.

The middle teeth are placed near the nippers or gatherers, one above, and one below, on each side of the jaws. They come out and appear between three and a half and four years.

The corner teeth are placed fill more forward in the mouth, one above, and one below, on each side of the jaws. They begin to shoot between the fourth and the fifth year, and are got above the gum at five years; and when surmounting the gum at that age, they become hollow, and mark commonly till seven or eight years. By marking is meant, that in the hollow or cavity of the corner teeth a little black speck is formed, which, from its resemblance, is called the bud or eye of a bean, or the mark. But when the horse pauses, the cavity begins to fill, and the black mark disappears by degrees; yet this diminution of the cavity and the mark continues from six to seven and a half. However, at eight years, the cavity is filled up, and the black mark gone; and the tooth is then full, and even as if it had been thinned. It is then said, that the horse has raised, which happens a little before the eighth year; and after that, the horse does not mark; so that the full knowledge of his age is then formed from his tufles.

The tufles are placed beyond the corner teeth, upon the bars, two on each side below, without being preceded by any foil teeth. The two under tufles cut sometimes at three years, sometimes at three and a half, sometimes at four;
four; bit the two upper tusks sometimes at four, sometimes at four and a half; sometimes before and sometimes after the corner teeth, without any certain rule; and till the age of fix they are chambered within. And at about ten years of age the two under tusks appear much worn, which serves for that age. After that they grow out in length, and become bare of flesh, because the gum shrinks and retire; and at last, about the fifteenth or sixteenth year, the horse begins.

It is sometimes said, that a horse is not capable of any great fatigue till his tusks have cut the skin. See Age, in Horsemanship.

The teeth in sheep are divided into two kinds, the incisors and the molares, or the cutting and dividing, and the rubbing and grinding teeth. Such sheep as are full-mouthed have eight of the first sort of teeth; throwing up two every year, consequently lose their fucking teeth. The incisors are found to wear down in proportion to the action which they have; but the molares, having more strength, and a different form, do not suffer so much in this way.

It has been suggested by an experienced sheep-farmer, that these sorts of young animals mostly renew their first two teeth at from about fourteen to sixteen months of age; and after that, every year nearly at the same time, until they are turned three years old, or, in the technical language of the sheep-maister, three shears, when they become full-mouthed; for although they have eight teeth before in the under jaw, it is commonly believed that they only cast and renew the fix infinite ones. Shepherds, however, differ much on this point, some contending that they only shed the fix fore-teeth, while others maintain that they cast the whole eight fore-teeth. The matter is, therefore, not yet well ascertained. Some properly remark, that sheep are very uncertain in their throwing up their teeth; much depending upon their being early or late lambed, well or ill fed, and other similar circumstances. Taps have been known to have four broad or renewed teeth, when by the age, as thrown up in the above manner, they ought to have had only two. Some sheep are remarked to be more backward than others, by several months, in proportion to their strength of constitution, and other matters.

In Romney Marsh the teeth of sheep are found to decay much faster, it is believed, than in any other part of the country. Close feeding wears the teeth exceedingly; of course, the teeth of the sheep of those who flock the hardiest, commonly decay the sooner. The sheep graziers in this district are very particular in moulting their sheep, which are kept or rejected according as their mouths are found to be good or bad; as, where the latter is the case, they have great difficulty in maintaining themselves during the winter season.

It is noticed that sheep, about the time of renewing their teeth, are very tender in their mouths, and do not thrive so well as they do at other seasons. At one season a teas, it is suppofed, may starve any sheep by close feeding; but on the renewal of its broad teeth, any sheep may starve it.

In the above district, the barrens or old breeding ewes are generally cast off when they have had their third lamb; though sometimes, if their mouths be good, and they are often better than those that have had only one lamb, they are kept for the fourth lamb; nor is this suppoled a bad practice, since by it some valuable ewes may be referved.

Sheep are seldom kept here to any great age: some fa- vourites are, however, kept till ten years old, without a tooth in their heads. Some have heard of their living twenty years. In the county of Hereford they are said to live to a great age: they live on long grass in the summer season, and

peace-harrow and other similar matters in the winter, which do not wear their teeth so much as when they labour hard on a close short-set turf. See Sheep.

The teeth of the various other sorts of domestic animals have hitherto been but little noticed or attended to by fore or folk masters, though they are probably, in many cases, as much changed, and serve to mark the ages and growths of the animals as much and as certainly, as in the infancies and cafes which have been given above.

Teeth, Mammoth's. See Mammoth's Teeth.

Teeth, Wolf's. See Wolves' Teeth.

Teeth of a Wheel, in Mechania. See Wheel.

TEETHING. See Dentition, and Distases of Teeth, supra.

TEETMOW, in Geography, a town of Bengal: 40 miles S.E. of Curruckpour.

TEFEE, a town of Brazil; on the river of the Amazons; 220 miles W. of Fort Rio Negro.

TEFELSORD, a town of Transylvania; 7 miles N. of Scheiburg.

TEFEN, a town of Asiatic Turkey, in Natolia; 28 miles S.W. of Amasfe.

TEFFASSAD, or Tessaada, a town of Algiers, whose ruins extend along the coast of the Mediterranean near a league, supposed to have been the ancient Tipasa; 32 miles S.S.W. of Algiers. N. lat. 36° 32'. E. long. 2° 54'.

TEFEHNE, or Tettehno, a town of Morocco, on the coast; 60 miles W. of Morocco.—Also, a river of Morocco, which runs into the sea near Mogador.

TEFFEREG, a town of the archbishopric of Salzburg; 1 mile S. of Windisch Matray.

TEFLIS, a town of Asia, capital of the principality of Georgia, and seat of a bishop, founded, according to an old inscription in the citadel, by a certain prince Sarangen, A.D. 1063, is situated on the N.W. side of the great plain of Karajo, at the foot of a hill, occupying both banks of the river Kur, over which is a bridge. This city is surrounded with iron walls, except towards the river; and has a large fort at the declivity of the mountain, which contains a garrison, and is often made use of as a place of refuge for criminals and debtors. All the houses are of stone, with flat roofs, which serve, according to the custom of the East, as walks for the women. The buildings are neat and clean; but the streets are exceedingly dirty and narrow. The town contains one Roman Catholic, thirteen Greek, and seven Armenian churches. Near it are some warm springs, and hence it is called Theletokar, or Warm town. In the year 1386, this town was taken by Tamerlane, and the king of Georgia made prisoner. In 1723 it was taken by the Turks; and in 1734 retaken by Khoul Khan. Before it was taken by Aga Mahomed Khan, in 1797, it contained 4000 houses, and 22,000 inhabitants. Although most of the houses, which are neatly built, are now standing, the population does not exceed 15,000 souls. It was for many years the residence of prince Heraclius, and is at present that of the Russian governor and commander-in-chief, who has at all times a large force stationed in the city, to the disgust of the inhabitants, who fludder at the thoughts of their wives and daughters being constantly exposed to the view and importunities of strangers. This circumstance tends to render the Russian name detested by the Georgians: 100 miles N.N.E. of Erivan. N. lat. 42° 45'. E. long. 45° 20'.

TEFTERDAI, the name of an officer of dignity in the Eastern nations. In Egypt he is lord high treasurer of the tribute paid out of the lands to the grand signor. He is named for
TEG

for a year by the Porte, but is generally continued in his office many years. This office is sometimes given to one of the poorer boys, to help him to support his dignity; and frequently to a quiet one, who is not likely to enter into intrigues. For one party never cares that a stirring man of the opposite party should be invested with an office of this dignity. See Dystardar.

TEFUT, in Geography, a town of Africa, in the country of Darah, formerly the capital of the ancient kings of Darah, now gone to decay.

TEFZA, a town of Morocco, built by the Abissines on the site of a mountain: the surrounding walls are composed of blocks of marble; 70 miles N.E. of Morocco. N. lat. 31° 46'.

TEFZRA, a town of Algiers; 15 miles S. of Tremenec.

TEG, a term used in some parts of the kingdom by the farmers, to express a lamb of a year old. Among sportsmen it denotes a roe of two years old. When a flock of ewes and lambs are turned into a turnip-field, the young lambs of three weeks old will immediately fall to eating the turnips, and scoop them very prettily; but these tegs will not touch them for several days. They usually stay till almost starved before they begin, but when they have begun, they soon grow fat.

In the Romney Marsh system of management, both the ewe and the wether tegs are kept upon the upland pastures during the winter season, by which advantages are gained in various ways. They are by this means enabled to keep more ewes and fattening sheep on their marsh-lands, and to have the tegs when the pastures require them. See Sheep.

TEGADOO BAY, in Geography, a bay on the east coast of the most northern islands of New Zealand, discovered by Captain, then lieutenant Cook, in 1769. S. lat. 38° 10'. W. long. 181° 14'.

TEG/EA, JIMMEL, in Ancient Geography, a town of Africa, mentioned by Hirtius, situated S.W. of Leptis.

TEGANAN, an island of the Mediterranean, in the vicinity of that of Rhodes.

TEGAPATAM, in Geography. See Fort St. David.

TEGAREE, a town of Bengal; 11 miles N. of Kithenagar.

TEGASA, a town of Africa, capital of a district in Zenhaga; near it is a salt-mine, about 300 miles from the Atlantic, and 400 S. of Cape Non. N. lat. 22° 20'.

TEGEA, in Ancient Geography, a town of Africa Propria, between the two Syrtis. Ptol.

TEGEA, a town in the S.E. part of Arcadia, at a small distance from the Argolid; and placed by M. D'Anville on the site of the modern Molia. In this place was a famous temple of Minerva Aea, which was a battle of the gods, which was removed to Rome by Augustus. This temple contained a number of other curiosities; and the priesthood in it was exercised by a young female under fifteen years of age. Near this temple was a salubrium, in which were celebrated games in honour of Minerva, and others in memory of a victory gained over the Lacedaemonians. The public place was ornamented with statues, and particularly one of Mars Gymnocothonus, sculptured upon a column. The epithet served to maintain the remembrance of a victory obtained by the valour of the females of Tegea. At a small distance from the public place was a magnificent theatre, encompassed with bronze statues. This city suffered much in the wars which raged in Arcadia in the time of the Achaeans league. Pausanias says that here was a temple of Venus Urania, near that which was dedicated to Ceres and Proserpine. The Tegeates were a valiant people. Herodotus (l. i. c. 61.) mentions them with commendation. The Lacedaemonians ravaged the territory of Tegea, and at length obtained a superiority over its inhabitants.

TEGEA, a town of the ile of Crete, said to have been inhabited by Agamemnon.—Alfo, a town of Macedonia.

TEGEHET, or TEGHILT, in Geography, a town of Africa; 120 miles S.S.W. of Fez.

TEGEL, Eric, in Biography, a Swedish historian, and principal secretary to Eric XIV. His father, having incurred the just resentment of Eric, as the cause of the misfortunes that occurred during his reign, was apprehended by Charles, duke of Sodermanland, the brother of Eric, and put to death at Stockholm in 1568. Charles, however, took the fon under his protection, and sent him to Germany for improvement; and when he had visited Spain and Poland, appointed him his secretary. In 1614 he was nominated by Gustaves Adolphus historian of the kingdom, and in 1617 a privy-councillor. He died at Stockholm in 1636, and left several works, of which the following were printed in Swedish: viz. “The History of Gustaves I. in two Parts.” Stockholm, 1622, fol. “The History of Eric XIV. with Stierman’s Remarks,” 1617-21, 4to.

TEGENUM, or TEGIANUM, in Ancient Geography, a town of Lucania.

TEGERHY, or TEGARHA, in Geography, a town of Africa, in the country of Fezzan; 80 miles S.W. of Mourgouk. It is a small town, and collects from its lands little produce besides Dates and Indian corn. N. lat. 26° 17’. E. long. 15° 2’.

TEGERNA, a town of Bavaria, on a lake called the Tegern See, anciently Lacus Tigrinus. Here is a celebrated abbey, founded by Albert and Ockar, two Bavarian princes; 28 miles S.S.E. of Munich.

TEGESSUS, in Ancient Geography, a town of the island of Cyprus.

TEGEWSE, in Geography, a town of Africa, near the lake of Marks, anciently called Tichafa; 38 miles S.S.W. of Gafsa.

TEGHIR, a large river of Miugrella, which rises between the Alani and Scenti hills, and disembogues into the Pafus, 10 versts above the Scharifkali.

TEGIANUM, in Ancient Geography, a town of Italy, in Campania, according to Claudius; though others assign it to Lucania, and call it Tegenum.

TEGIUM, a town of Alba Minor, in the Troade.

TEGLA, in Geography. See TUGALLA.

TEGLO, a town of Italy, in the Valteline, situated upon the top of a mountain, is a long straggling place, containing about 300 houses, about 9 miles from Tirano, and 12 from Sondrio. Close to the town are the ruins of a fortres, standing upon an insolated rock, and formerly esteemed of great strength. This elevated spot commands a rich and extensive prospect from Tirano to the lower part of the valley, beyond Sondrio, as far as Mornegno. The government of Teglio is laid to contain the 13th part of the Valteline; it is the most populous district, and contains about 8,000 souls. In a good season, it produces much more corn than is sufficient for the consumption of the inhabitants, and rivals Sondrio and Tirano in the goodness of its wine.

TEGNA, in Ancient Geography, a town of Gaul, on the banks of the Rhone, not far from Valenta, to the north; the modern Tein.

TEGOMA, in Geography, a town of Africa, in the country of Aoudan; 50 miles S. of Agades. N. lat. 19° 10’. E. long. 12° 20’.

TEGO.
TEGORARIN, a town of Africa, in Biledulgerid; 70 miles N.N.W. of Gardeish.

TEGRUO, a town of New Mexico, in the province of Culiacan; 40 miles N. of Culiacan.

TEGUIXIN, in Zoology, a species of lizard; which see.

TEGULA, in Ancient Geography, a town of Sardinia, on the route from Sulci to Nora. Anton. Itin.

TEGULET, in Geography, a town of Abyssinia; 180 miles S. of Gondar. N. lat. 9° 54'. E. long. 38° 35'.

TEGUMENT. See INTEGUMENT.

TEGYRA, in Ancient Geography, a town of Greece, in Bactria.

TEHÁE, in Geography, a town of Curdistan; 30 miles E. of Amadih.

TEHAMA, a sandy belt which encompasses the peninsula of Arabia, beginning at Suez, and terminating at the mouth of the Euphrates. It is of various breadth; for the most part about two days' journey from the sea-shore to the rife of the hills; or at least this is the breadth of the plain adjacent to the Red sea. It bears every mark of having been anciently a part of the bed of the sea. Its bottom soil is a greyish clay, with a large proportion of sand, and having marine exuviae interpered a great distance from the sea-shore. It contains large strips of salt, which in some places rise up to hills. Its regular inclination towards the sea indicates that it has emerged gradually. The small eminences on the confines of this plain are composed of calcareous rocks, with a blackish appearance, as if they had been burnt by the sun. The adjoining hills contain chitlits and bafaltes. The sea, it is thought, still continues to recede, and the Tehama on that side is gradually extending its limits. History confirms these appearances of the gradual recession of the waters; and mentions, as sea-ports, several places which are at present inland, without noticing the present maritime towns, which must have been of later origin than the formation of the land on which they stand. These newly-formed lands, however, are barren and unfruitful.

TEHRAUN, one of the five large districts of the province of Irak, in the Persian empire; the other four being Ispahan, Naen, Mullayer, and Kermanshah. Tehraun is also the name of the present capital of Peria, which is rendered interesting by the surrounding scenery. To the S. are the extensive ruins of the grand and once proud city of Ras; to the E. the mountains of Elburz (famed in the Persian traditions as the abode of demons); to the N. the snow-clad summit of the lofty Dumawend; and to the W. a plain enriched with cultivation and villages, and forming a delightful contrast with the rugged and stupendous rocks which flit it on the N. and S. Tehraun is about four miles in circumference, surrounded by a strong wall, flanked by innumerable towers, and a noble dry ditch, with a glacis between it and the wall. The only building of consequence within the city is the citadel, which contains the palace of the sovereign and his officers. It was founded by Kurim Khan, enlarged by the late king, and beautified by the present sovereign. The fortifications can be considered as formidable only in a country where the military art is unknown. The population is variable, being in summer about 10,000, and in winter not less than 50,000 people. The environs of Tehraun are not unpleasant; the plain, to the E. and W., being covered with villages, and abounding in grain. On the N. side the king has completed a palace, which, from its situation, and the fine gardens that surround it, is a most delightful residence. There are many reasons which have probably induced the late king to fix upon Tehraun as the capital of his dominions. Its central situation, and the easy defence which it affords to the Persian empire; the fertility and productivity of the surrounding country; the number of wandering tribes that have settled round it, and that may be easily and soon subdued; and above all, perhaps, its proximity to Allahbad, the native city of Aga Mahomed Khan, and also to Mazanderan and Dabadian, countries possessed by the Kajar tribe, of which he was the chief, and on whose power and affection to his person his authority was in a great measure founded—all these considerations might have induced him to make this city the capital of the empire. N. lat. 35° 40'. E. long. 50° 32'.

TEHROOT, or ZENHEROOT, a town of Persia, in the province of Kerman, surrounded by numerous gardens; 8 miles N.W. by W. from Subzifian, and about 52 miles from the ruins of Bumian.

TEHUACAN, or TEGUACAN, a pleasant town of New Spain, between Oaxaca and Orizaba. It is situated in a delightful vale, near a river of the same name, called also Rio Grande, of a nitrous quality, and so petrifying a nature, that the shores resemble ruinous walls. It has four churches; and the streets, squares, and houses are neat and modern. The chief market is that of wheat, which is excellent, and the pomegranates are highly esteemed. Besides numerous families of Spaniards and Mulattoes, there are about 2000 Indians. In the vicinity of this town are two wheat-harvests, one in May, the other in September.

TEHUELS, a large lake of South America, towards the S. of Chile.

TEHUKHA, a town of Thibet; 4 miles S. of Jhanfu Jeung.

TEICHÓPEUS, a town in Greece, among the Athenians, an officer who had the care of the city walls; their number was the same with that of the tribes, every tribe having the choice of one.

TEIGN, in Geography, a river of England, in the county of Devon, which runs into the English Channel at Teignmouth.

TEIGNMOUTH, a market-town in the hundred of Exminster, and county of Devon, England, is situated, as its name imports, at the mouth of the river Teign, and is sheltered on the east and north-east by a chain of hills, near the foot of which it stands. It is distant from Exeter 12 miles S. by E., and from London 187 W.S.W. A small rivulet divides the town into two parts or parishes, called West and East Teignmouth. The town is recorded to have been burnt in the tenth century by the Danes, who, having landed here, and defeated the king's lieutenant, ravaged the country to a considerable extent. It was also nearly consumed in the reign of queen Anne, when the French landed and set fire to it; one of the new streets, erected with the money procured by a brief for the diffused inhabitants, was named French-street, as a memorial of the calamity. Since that period the town has become of much greater importance, and is now one of the most fashionable watering-places in the western part of England. The principal resort of company is East Teignmouth, where the public rooms and theatre are situated; the former, a neat building, contains tea, coffee, assembly, and billiard-rooms; the theatre has been recently built on a spot of ground given by Lord Courtenay, and was first opened in the summer of 1802. A walk by the promenade leads from the public rooms towards the south, over an extensive flat called the Den, on which is a small fort erected for the defence of the town. The view hence up the river, is extremely beautiful; the ground gradually rising on each side to verdant hills, well cultivated, and adorned with woods. The cliffs overhanging the sea have a singular appearance, being, with the exception of a few
a few bread patches of verdure, of a deep red colour, and
mount in rude irregular shapes to the height of seventy or
eighty feet. Near the centre of West Teignmouth is the
church, a very ancient stone fabric, built in the form of a
croft: the roof is supported in a singular manner by the
ramifications of a wooden pillar, that was formed from the
trunk of a single tree. East Teignmouth church is a venera-
ble pile near the beach, and, from the appearance of its
architecture, was probably one of the earliest structures
erected after the coming of the Normans. The trade of
Teignmouth consists chiefly of commercial intercourse
with Newfoundland; the exportation of clay, and the
importation of coal; and is carried on principally in craft
built at the place, where are conveniences for launching
vessels of a hundred tons. The clay exported is brought from
Bovey, for the most part by a canal; and dug on the estate
of James Templar, Esq., who, with true patriotism, is em-
ployed indefatigably in promoting the solid interests of his
country, by improving agriculture, and encouraging manu-
factures. West Teignmouth had anciently a chartered mar-
ket, held on Sundays; but this was discontinued by order
of the sheriff in the reign of Henry III. The market
is now held on Saturdays. Salmon, trout, whiting, mac-
karel, and various other kinds of fish, are taken here; and
by some excellent local regulations, the inhabitants have the
privilege of supplying themselves before any can be sold
to the dealers. The lord of the manor holds a court-baron,
or court-leet, in the town once every year: at which court a
jury is nominated, two constables deputed and sworn, and a
portreeve chosen, who is invested with considerable authority.

In the population return of the year 1811, West Teign-
mouth was situated to contain 544 houses; East Teign-
mouth, 168; the inhabitants of the former being 2080; of the
latter 813: making an aggregate of 2893 persons, occupying
629 houses.

Nearly opposite Teignmouth, and almost under the pro-
montory called the Nefs, is the hamlet of Shaldon, the pro-
erty of lord Clifford, which has lately become a favourite
summer residence for many families who visit the watering
places on this coast. The chapel, erected about the year
1670, stands in a beautiful situation, a little above the
Teign, about three quarters of a mile from the hamlet, and is
approached by a level walk shaded with luxuriant trees.—

J. Britton and E. W. Brayley, 1803. Warner's Walk
through the Weftern Countries, 1800.

TEJEUT, a town of Morocco; 15 miles S.E. of Mog-
gador.

TEIL, a river of France, which runs into the Atlantic,
N. lat. 47° 39'. W. long. 3° 8'.

TEIL, Le, a town of France, in the department of the
Ardeche, on the Rhone; 12 miles S. of Privas.—Alfo, a
town of France, in the department of the Ille and Vilaine;
15 miles S.E. of Rennes.

TEILLEU, Le, a town of France, in the depart-
ment of the Channel; 6 miles S. of Mortain.

TEIN, a town of Bohemia, in the circle of Pifien;
6 miles N.E. of Tachau.

TEIN, or Teyn, a town of Bohemia, in the circle of
Becbia; 4 miles S. of Becbin.

TEINITZ, a town of Bohemia, in the circle of Pifien;
26 miles S.W. of Pifien. N. lat. 49° 30'. E. long. 12°
57'.—Alfo, a town of Moravia, in the circle of Brunn; 27
miles S.S.E. of Brunn.

TEINITZ Jugferm, a town of Bohemia, in the circle of
Schlan; 8 miles W. of Schlan.

TEINTS, and Semi-Teints, in Painting, denote the fe-
veral colours used in a picture, considered as more or les
high, or bright, or deep, or thin, or weakened, and dim-
ified, &c. to give the proper relief, or softness, or dif-
tance, to the several objects. See COLOURING.

The word is pure French, where it signifies the fame.

TEIRCE, or Teirs. See Tierce.

TEISBACH, in Geography, a town of Bavaria, on the
River; 1 mile W. of Dinglinghen.

TEISENDORF, a town of the archbishopric of Salz-
burg; 12 miles W.N.W. of Salzburg.

TEISKO, a town of Sweden, in Tavafland; 45 miles
N.N.W. of Tavafluth.

TEISSIER, Anthony, in Biography, a voluminous
French writer, was born at Montpellier in the year 1632.
Having studied Greek and philosophy at Orange, and being
defined for the miniftry among the Calvinifts, he applied
himself to Hebrew and theology at Niomes; and after spend-
ing some time in the academy at Montauban, he removed to
that of Saumur. From thence he went to Paris, where he cul-
tivated an acquaintance with several learned men; but
giving up his designs for the miniftry, on account of a dif-
order under which he laboured, he turned his thoughts to
jurisprudence, and took the degree of LL.D. at Bruges.
In 1683 he married; but upon the revocation of the edict
of Nantes, he was obliged to quit France. He then retired
with his wife to Switzerland, and was recommended by
Turrein and Heidigger to the family of Efcher, a burgo-
master of Zurich. Declining to accept advantageous offers
if he returned to France, he engaged with the senators of
Berne for two years in conducting a French gazette in that
city. In 1691 he quitted Berne and went to Zurich; and
from thence he proceeded to Brandenburgh, where refugees
enjoyed common privileges with those of the natives of the
country. At Berlin, the elector appointed him historiogra-
pher, with an annual pension of 300 crowns, which was suc-
cessively augmented. He was also honoured with the title
of counfellor of legation, and ordered by the elector to tran-
late into French the life of his father, Frederic William,
written in Latin by Puffendorf. For this service he was
liberally rewarded, though his translation was never printed.
He was afterwards employed in composing many works for
the instruction of the prince royal; and though his confi-
tuation was delicate, he enjoyed good health till his death,
which happened in 1715, in the eighty-fourth year of his
age. It would exceed our limits to enumerate all his works;
an ample account of them may be found in the General
Biography.

TEIT-TCHANG, in Geography, a town of Corea; 13
miles N.E. of Haimen.

TEITEI, in Ornithology, the name of a Brazilien bird, a
species of tanagra, in the Linnaean fystem, called alfo gu-
rananemestza, and guaranati.

It is of the fize of our red-breast, and beautifully co-
oured.
It fings very sweetly, and is kept in cages, five or fix to-
gether in the fame cage. Marcgrave's hill of Brazil.

TEITH, in Geography, a river of Scotland, formed by
streams from several lakes, in the county of Perth, which
runs into the Forth, two miles above Stirling.

TEJUCO, the capital of the Diamond district in Brafil,
situated in a ravine at the foot of a mountain. Tejucru
is separated by the small rivulet of St. Francisco from the
opposite mountains. The greatest of the diamond works,
called Mandanga, is situated on the river Igritahamba, and
employs about 1000 negroes, sometimes double this number.
This rich river, formed by the junction of several streams, is as
wide as the Thames at Windsor, and in general from three
to nine feet deep. The part now working is a curve or elbow, from which the current is diverted into a canal cut across the tongue of land round which it winds; the river being flopped below the head of the canal by an embankment formed of, several thousand bags of sand. The deeper parts of the channel of the river are laid dry by large caissons, or chain-pumps, worked by a water-wheel. The mud is then carried off, and the caffalhão is dug up and removed to a convenient place for washing by machinery adapted to this purpose. The contrivance for obtaining the diamonds from the caffalhão is particularly described by Mr. Mawe, ubi infra. Têjucu is situated in a fertile district, which produces nothing for the maintenance of its inhabitants, whose number is about 6000; and therefore depends for a supply of provisions, on farms situated at the distance of several leagues. Nevertheless, Têjucu may be called flourishing, on account of the circulation of property created by the diamond-works in its vicinity. The annual sum paid by government for the hire of negroes, salaries of officers, and various necessaries, such as nitre and iron, does not amount to less than 35,000l. and this, added to the demands of the inhabitants of the town and its neighbourhood, occasions a considerable trade. The shops are stocked with English cottons, baizes, and cloths, and other manufactured goods; also hams, cheese, butter, porter, and other articles of consumption, which are brought on mules from Bahia and Rio de Janeiro. Têjucu, from its situation on the fide of a hill, is very irregularly built; its streets are uneven, but the houses in general are well constructed, and in good condition, compared with those of other towns in the interior. Its name, signifying in the Portuguese language a muddy place, is derived from places of that description near it, which are rendered liable by being covered with large pieces of wood. The diamonds are locked in the treasury under three locks; and those found in the district are deputated every month, as they are received from the works; they are carefully weighed, and some of them selected and kept separate. The average quantity obtained may be estimated at from 20,000 to 25,000 carats annually, which are sent under a military escort to Rio, and there lodged in the treasury. The diamonds are tied up in black silk bags, and deputated in elegant inner cabinets, all which are locked up in strong chests, bound with iron. Têjucu affords some good barley, but grafts for cattle is scarce and dear. Most parts of the country abound in oranges, pines, peaches, guavas, and a great variety of indigenous fruits: ginger and pepper grow spontaneously, and many species might probably be cultivated with success. Mawe’s Travels in the Interior of Brazil, 1812.

TEJUGUACU, in Zoology, the name of a species of lizard, common in the Brazils, and called also temapara. It much resembles the iguana in its general figure, but differs from it in that its whole body is black, only variegated with some white spots. It lives principally on the sucking of eggs, but it is capable of bearing hunger a long time; Maregrave having kept one alive seven months without eating. This species afforded also a certain testimony to that author of the reproduction of the tail when cut off. Ray.

TEJUM, in Ancient Geography, a town of Asia Minor, situated on the Euxine sea, on the frontiers of Paphlagonia, near the small river Biliss, 370 stadia from the town of Heraclea. It was a Greek Ionian colony, which derived its name and its origin from Tis, a Mileitan priest, according to Arrian and Mela. The worship of Jupiter named Patarus was practised in this town, according to Demochernes. On the E. the territory of this town was bounded by the river Parthenius. The town was much augmented when the empire of the Persians was destroyed.

TEIUNHANA, in Zoology, the name of a small American lizard. It is about the thickness of one's little finger, and has a sharp nose. Its tail is very slender, fix fingers breadth long, and terminates in a point almost as sharp as a needle. Its head is covered with scales; and its back, sides, and legs, with a tender skin, as soft as satin to the touch; and its tail is covered with extremely minute scales, of a square figure. Ray.

TEKAT, in Geography, a town of Asiatic Turkey, in Notalia; 10 miles N. of Kiangari.

TEKEBI, a town of Egypt; 22 miles W.S.W. of Damietta.

TEKEH, a town of Turkish Armenia; 40 miles S.E. of Trehfonf.

TEKERE, a town of Hindooaftan, in Candeh; 14 miles E. of Barrawney.

TEKIN, a town of Asiatic Turkey, in Caramania; 100 miles W. of Tocat.

TE-KING, a city of China, of the second rank, in Quang-tung, near the river Si; 1064 miles S.S.W. of Peking. N. lat. 23° 12’. E. long. 111°—Alfo, a city of China, of the second rank, in Quang-tung; 1065 miles S. of Peking. N. lat. 23° 12’. E. long. 110° 50’.

TEKKIUR DAG, a mountain of European Turkey, in Romania; 32 miles S.S.E. of Adrianople.

TEKLA, a town of Bohemia, in the circle of Chrudim; 6 miles S.W. of Leutfitich.

TEKMABAD, a town of Persia, in the province of Segeltan; 70 miles E.N.E. of Boll.

TEKOA, a village, and anciently a city of Paleaflne, built by Rehoboa, king of Judah, and considerable ruins appear of its ancient grandeur. It was the native place of the prophet Amos; 9 miles S. of Bethlehem.

TEKOLY, a town of Hindooaftan, in Bahar; 53 miles S.S.W. of Patna.

TEKUPHEL, or TEREKH, in the Jews Chronicle, are the times in which the fun proceeds from one cardinal point to the next.

The same term is also applied to the moment in which the fun enters a cardinal point: these four terms, or tekuphe, into which the Jews divided their solar year, are observed among the Jews with a great deal of ceremony; the reason, as we are informed by Münster, is this: That people have a notion, that in each tekupha the fun has a separate angel appointed to guard and direct it; and that in the very point where the fun finishes one tekupha, and enters upon another, before the one director has taken place of the other, the devils have a power to excite all kinds of tyranny in the water.

And hence, they fancy, that if any body drinks the smallest quantity of water at that time, he will infallibly have a dropy, or some other grievous diemter. The tekupha of Tifi corresponded to the autumnal equinox, that of Tcheth to the winter solstice, that of Nifan to the vernal equinox, and that of Tamuz to the summer solstice.

TEKY SOUND, in Geography, a road on the coast of Georgia, south of the Savannah river, where a large fleet may anchor in ten or fourteen fathoms, and have safe entrance over the bar of the river; the flood tide generally seven feet.

TEL ARENAS, a town of Asiatic Turkey, on the Euphrates; 5 miles W.N.W. of Diarbekir.

TEL GIZIR, a town of Asiatic Turkey, in the province of Diarbekir; 16 miles W. of Merdin.

TEL KIARAN, a town of Asiatic Turkey; 30 miles S.S.W. of Diarbekir.
TEL Mufet, a town of Asiatic Turkey, in the government of Diarbekir; 33 miles N.W. of Mosul.

TEL el Judah, a town of Egypt, where the Jews had formerly a temple, destroyed by Vespasian; 17 miles N.E. of Cairo.

TELA, in Ancient Geography, a town of Spain, on the route from Aturdica to Saragossa, between Intercatia and Pintia. Anton. Itin.

TELA, or Conflantia, a place of Asia, in Melopotamia, near the mountains, about N. lat. 37° 25'.

TELA Celluloida, in Anatomy, the Cellular Substance; which see. It is sometimes also called tela mucosa.

TELACH, in Geography, an island of Rupha, in the Penziniki in. N. lat. 61° 35'. E. long. 150° 12'.

TELAMON, in Ancient Geography, a promontory of Italy, in Etruria, at the foot of which was a port, between the rivers Almina and Alma. (Anton. Itin.) Pliny calls this port Telamon.

TELANOE, in Geography, a town of the Stato del Prefidii, on the coast; 10 miles N. of Orbistello. N. lat. 42° 38'. E. long. 11° 6'.

TELAMONES, a name given by the Romans to what the Greeks called Atlantis; viz. the figures of men supporting entablatures, and other projecting. See TELAMON.

The word, according to some, is derived from the Greek τελαμον, from τέλα, or τελαά, I bear.

Among the Greeks they were called atlantes, ἀτλάντες, which comes from the same word, τάλαιον, or ταλάν, by the figure metaphysis.

TELAMONES is also used by surgical writers sometimes for lint, and sometimes for the fillets or bandages which they apply over their dressings.

TELANA, in Ancient Geography, a very ancient town of Asia, in Assyria. Steph. Byz. says that the king made it the place of his residence before Nineveh was built.

TELANADING ISLANDS, in Geography, three small islands lying east and west, near the N.W. coast of the island of Gilolo. N. lat. 2° 18'. E. long. 127° 36'.

TELANDRIA, in Ancient Geography, an island on the coast of Lycia, in Asia Minor. Pliny.

TELANDRUS, a town of Asia Minor, in Lycia. Pliny.

TELAPSY, in Geography, a town of Asiatic Turkey, in the province of Diarbekir; 20 miles W. of Mosul.

TELARUSE, a river of Asia, which forms the north boundary of the kingdom of Quedar, separating it from Lower Siam, and runs into the East Indian sea, N. lat. 6° 55'. E. long. 99° 42'.

TELAUGIA, in Natural History, the name of a genus of scrupi, of a glittering appearance, usually containing flakes of tale, and emulating the structure of the granites. Hill.

Of this genus we have twelve species.

TELCHINES, in Ancient Geography, a people who derived their origin from the island of Crete. They established themselves in Cyprus, and in Rhodes, where it is said they invented the use of iron and brass.

TELCOOTE, in Geography, a town of Hindooftan, in Orella; 20 miles S.E. of Jaypore.

TELDOM HOTUN, a town of Chinese Tartary, on the west side of the river Saghalien; 745 miles N.E. of Peking. N. lat. 49° 56'. E. long. 127° 33'.

TELÉ, Τέλι, among the Athenians, those revenues that were brought in by lands, mines, woods, and other public possessions, set apart for the use of the commonwealth; as also tributes paid by sojourners and freed-servants, and the customs laid upon certain trades and goods.

TELEBA, in Ancient Geography, a town of Albania, between the mouth of Soana and that of Garrus. Ptol.

TELEBOAS, a river of Asia, in the environs of the sources of the Tigris; surrounded, as Xenophon says, by a great number of villages.

TELEGRAPH, a machine adapted for communicating intelligence at a considerable distance, by making various signals, which have been previously agreed upon between two parties, to represent letters, words, or ideas. The means of making signals that are used in naval and military operations, are not called telegraphs, although they effect in a great degree the same object. See SIGNAL.

The word telegraph, which is derived from two Greek words, τέλος, at a distance, and γράφειν, to write, was brought into use about 1793 or 1794, when the French directory established machines of this kind for communicating intelligence between Paris and all the principal towns in France. The British government soon after adopted the same measure, and it has since become very general.

No machine for making signals can with propriety be called a telegraph, unless it is adapted to express a sufficient number of letters or words to form a complete language, and which can therefore be made to communicate any information which can be expressed by oral or written language. Let perfect systems of signals, which extend only so far as to communicate intelligence of events which have been foreseen, and the appropriate signals previously arranged, are still called signal flags, signal lanthorns, signal guns, or fires, &c.

When people wish to transmit intelligence to others at a distance, in a quicker manner than by letters sent by messengers or carrier-pigeons, it can be done only by signals. These may be employed in three different ways: either by single signals, which, according to previous agreement, convey whole ideas; or by several successive signals, which, by representing letters and words, answer the same purpose; or otherwise, by employing signals which express numbers, each person being provided with a dictionary in which every word has a number affixed to it.

The first kind of signals were employed in the earliest periods, and some of them were suited to the ear as well as to the eye. For the making of visible signals, the ancients employed fire and smoke, torches, flags, &c.; and in modern times, sky-rocketes have been used. For the audible signals, they employed drums and trumpets; and since the invention of gunpowder, the firing of cannon has been applied to the like use. But all these methods are incapable of expressing what could be communicated by speech and writing; and the means of expressing all the possible variations and combinations of the letters of the alphabet, form, in a proper sense, the true telegraphic art. Even the signals commonly used at sea, as they extend only to particular circumstances, are, when compared to signals by letters, only a kind of hieroglyphics.

The proposed object of the telegraphic art is, therefore, to obtain a figurative language, the characters of which may be distinguished at a distance. On the first reflection, we find that the practicable modes of such distant communications must be confined to sound and vision; each of which is in a great degree subject to the flight of the atmosphere: for independent of the wind's direction, it is known that the air is sometimes so far deprived of its elasticity, or some other quality that influences the conveyance of sounds, that the heaviest ordnance can scarcely be heard farther than the shot flies. It is also well known, that in thick hazy weather, the largest and most
molt defined objects become totally obscured at a short distance. No instrument, therefore, designed for the purpose can be perfect. We can only endeavour to diminish these irreducible defects as much as may be.

The most barbarous nations employed signals, which could quickly inform them of the approach of enemies, as appears by the testimony of several ancient authors; and there is reason to believe that some sort of telegraphic communication was in use among the Greeks. The destruction of Troy was certainly known in Greece very soon after it took place, and before any person could have returned from it. A Greek play begins with a scene, in which a watchman defends from the top of a tower in Greece, and gives information that Troy is taken. "I have been looking out these ten years (says he) to see when that would happen, and this night it has been done."

In addition to the Stenterophonic tube which was known and used by Alexander the Great, the Romans had a method, in their walled cities, either of forming a hollow in the masonry, or of applying tubes to the walls, so as to confine or augment sound, and convey information to any part of their works. In lofty houses and warehouses, it is now a common custom to have a pipe, by way of speaking trumpet, to give orders from the upper apartments to the lower. By this mode of confining its volume, sound may be carried to a very considerable distance; but beyond a certain extent the sound will lose all articulation, and only convey alarm, without giving directions.

Every city of the ancient had its watch-towers; and the cátra flátiva of the Romans had always some spot, elevated either by nature or art, from whence signals were given to the troops cantonized or foraging in the neighbourhood. But it appears that they had not arrived to any greater refinements in the telegraphic art, than that on seeing a certain signal they were immediately required to repair to their appointed stations. Flags or ensigns, with their various devices, are of the earliest invention, especially at sea, where, from the first idea, which was most probably that of a vane, to shew the direction of the wind, they have been long adopted as the distinguishing marks of nations, and are now so perfected into a system of signals, that every requisite order and question is received and answered by the most distant ships of a fleet.

The system of signalling in use about half a century ago was very imperfect. It was a good deal amended and simplified by that lamented officer admiral Kempenfelt; and his system, as it was called, continued in use till within these twenty-five years. It was superseded in the navy by Sir Home Popham's, who first brought into practical utility a plan originally, it is believed, suggested by Mr. Richard Gower, of the East India Company's service, in his "Practical Seamenhip," published in 1794. This was the substitution of ten or twelve numbered flags, for a great number of flags. It is surprising that this easy scheme should not sooner have been discovered and adopted. Instead of the immense "colour chest" that we and our naval contemporaries can recollect, add the difficulty of finding and hoisting the variety of flags required, it is pleasing to witness the facility with which communications can be now made, by means almost as easy of application as the pen.

A system now in use, originating, as we have dated, with an officer of the East India Company's service, has recently been greatly improved by another of these officers. It is not easy to describe the nature of these improvements; nor proper, perhaps, were it otherwise; for the directors of the East India Company have deemed it expedient to keep them secret. The author of them is captain Thomas Lynn. His work was printed in 1814, at the Company's expense, in a considerable quarto volume, under the title of "Lynn's Improved System of Telegraphic Communication." It is adopted throughout the extensive service of the East India Company; and we are glad to see it noticed in the preface to the volume, that the highly respectable court of directors most liberally patronized the work and its author. We do not find, notwithstanding the manifest advantage of the "Improved System," that it has yet been introduced into the royal navy; although every officer in that as well as the East India Company's service, who have had opportunities of trying it, are loud in its praise. It adapts itself to every description of telegraphic machinery now in use; and, as far as we can see, that can be used: it requires fewer flags than were heretofore necessary; and its powers are vastly greater than the other codes or systems. This paragraph, and perhaps this whole page of our dictionary, can be thus communicated, word for word, or phrase by phrase, without difficulty, and with a rapidity unattainable by any scheme hitherto published. The numbers, and powers, and meaning of the signals, may be changed at pleasure: so that if the work fall into improper hands, it merely communicates the principle on which the system is founded.

In applying this or a similar mode of communicating intelligence in land service, several objections present themselves: the variety of communications necessary to be made is so much greater, that the combination would become too complicated; and if the person for whom the information is intended, should be in the direction of the wind, the flag would then present a straight line only, and at a little distance would be scarcely visible. The Romans were so well aware of this inconvenience of flags, that many of their standards were solid, and the name manipulus denotes the rudeness of their ensigns, which was a trufe of hay fixed on a pole.

A beacon or bonfire, made of the first inflammable materials that offered, being the most obvious, is perhaps the most ancient mode of general alarm. By being previously concerted, the number of points where the fires appeared may have particular intelligence affixed. The fame observations may be referred to the more modern plan of throwing up rockets, whose number, or the places from whence they are thrown, may have affixed significations. Many of our hills still retain the name of beacon hills, from the signals which used to be made upon them, by means of fire and smoke, which were the chief things employed during the dark ages, and in the times of the feudal system. The fire was used by night, and the smoke by day. Within a few years, signals made by these means were very common amongst the smugglers on our coast.

The machine of Æneas, who wrote a treatise on the duties of a general in the time of Arilotcle, is described by Polybius to have consisted of two earthen vesseis, made exactly similar in all their dimensions: they were to be filled with water, and each was to have a cock or spout, which could be opened or shut at pleasure, and would, when open, discharge an equal quantity of water from both vessels, so that each of the vessels would take precisely the same period of time to discharge the whole, or any given proportion, of its contents. A float of cork was to be provided for each vessel to rest upon the surface of the water, and support a perpendicular item or index, which could be divided, and have certain sentences written to correspond with each division. The apertures of the spouts of the two vessels were to be previously adjusted, and the vessels filled with water to the same height, so that their floats and indices would correspond in pointing out the same sentences: then, if both cocks were opened at the same instant, the water would run out from each vessel, and the floats of both would subside together, so that when either index float
TELEGRAPH.

A flood at a particular sentence, the other index would, at the same time, point out the same sentence. Now this operation could be equally well performed when the two vessels were moved to any distance at all, provided the observers were within sight of each other, to be able to make the requisite signals for opening and shutting the cocks of both vessels at the same moment. The author thus describes the use of this instrument: The two vessels being prepared and adjusted, they must be carried to the two places where the signals are to be made and observed; water is poured into each, and the floats and indices are put into the vessels. When any of the events which are written upon the indices shall happen, a torch or light is raised, which must be held aloft till such time as another is raised by the party to whom it is directed. (This first signal is only to give notice that both parties are ready and attentive.) Then the torch or other light must be taken away, and the cocks let open instantly by both parties. When the interval or division on that part of the index where the event, of which notice is to be given or written, shall be fallen to a level with the vessels, then the man who gives the signals lifts up his torch, and on the other side, the correspondent signal maker immediately flushes the cock of his vessel, and looks at what is written on that part of the stick which touches the mouth of the vessel; on which occasion, if everything has been executed exactly and equally on both sides, both parties will read the same thing.

The proper telegraphic art was wholly unknown to the ancients. The Greeks and the Romans made use of pots filled with lighted twigs and straw for signals, over which they poured oil; and these being placed in certain rows, expressed certain letters, according to the order in which each row was lighted.

Polybius describes a new method of communication, which he invented by Cleoxenus, or by Democritus, and which Polybius himself very much improved. It possesses the principal advantage of the modern telegraph, viz. that, by means of signals, it communicates the letters of the alphabet, and can therefore be used to express any thing which can be required. It is only inferior to the telegraph in the means of making the signals, which is by the light of torches, and rather complicated, so that it would be tedious to transmit any thing more than short sentences. Polybius describes this method, which he calls Pyria, in the following manner: Take the letters of the Greek alphabet, and divide them into five parts, each of which will consist of five letters, except the last division, in which there will be only four. Let these be fixed on a board, in five columns. The man who is to give the signals is then to begin by holding up two torches, which he is to keep aloft till the other party has also shown two: this is only to denote that both sides are ready: these torches are then withdrawn. Both parties are provided with boards, on which the letters are disposed as formerly described. Then the person who gives the signal is to hold up torches on the left hand, to point out to the other party, from what column he shall take the letters as they are pointed out to him: thus, if the letter is to be from the first column, he holds up one torch; if from the second, two; and so on for the others. He is then to hold torches on the right hand, to denote the particular letter of the column that is to be taken. All this must have been agreed on beforehand. The man who gives the signals must have an instrument (instruments, perspective), consisting of two tubes, and so placed, that by looking through one of them he can see only the right side, and looking through the other, he can only see the left-hand side of him who is to answer. The board must be set up near this instrument; and the flations on the right and left must each be surrounded with a wall ten feet broad, and about the height of a man, that the torches raised above it may give a clear and strong light, and that when taken down they may be completely concealed.

The Regiomontanae triaemiana of a Benedictine monk, in the fourteenth century, seems to have been something of the same kind; but the first recorded experiment, after the manner of the Greeks, is described by Kircher, in his "Ars magna Lucis et Umbrae," under the title of Cryptogamia catoptrica; it was however imperfect, and could be employed only at a certain distance. Schott, in his "Technica curiosa," proposes, after an anonymous author, to erect poles upon an eminence, fo as to be distinguishable through a telescope, and on which proper signals could be elevated, as might be necessary.

The marquis of Worcester, who so justly celebrated for having first discovered that the force of flame could be applied to mechanical purposes, brought telegraphic communication to a considerable degree of perfection, if at least we give him credit for having really effected every thing which he mentions in his Century of Inventions. This little tract was published in 1663, and contains the following articles.

"No. 6. How at a window, as far as eye can discover black from white, a man may hold discourse with his correspondent, without noise made, or notice taken, being according to occasion given and means afforded, ex re natis, and no need of provision before-hand, though much better if foreseen, and means prepared for it, and a premeditated course taken by mutual consent of parties.

"No. 7. A way to do it by night, as well as by day, though as dark as pitch is black."

The marquis gives us no idea of the means which he used for exhibiting his signals, by which we can judge of the practicability of his plan for communicating any detailed intelligence.

Kessler, in his Concealed Arts, advises characters to be cut out in the bottom of a cask, so as to appear luminous when a light is placed within, and the characters must be changed successively to express words and sentences.

Dr. Hooke's Telegraph.—The first idea of a telegraph upon a similar construction to those used at present, was suggested by Dr. Hooke towards the end of the last century, the siege of Vienna by the Turks having turned his attention to the business. He gave the first complete description of such a machine, as appears by the following extract, from a paper of his, read before the Royal Society on the 21st of May, 1684. "I proposed (lays he) some years since, a method of discoursing at a distance, not by sound but by light: I say that it is possible to convey intelligence from any one high and eminent place, to any other that is in sight of it, though thirty or forty miles distant, in as short a time almost as a man can write what he would have sent; and as suddenly to receive an answer, as he that receives it has a mind to return it, or can write it down on paper. Nay, by the help of three, four, or more eminent places visible to each other, lying in a straight line, it's possible to convey intelligence almost in a moment, to twice, or thrice, or more times that distance, with as great a certainty as by writing.

"For the performance of this, we must be beholden to a late invention, which we do not find any of the ancients knew; that is, the eye must be affiled with telescopes, that whatever characters are exposed at one station, may be made plain and distinguishable at the other.

"First: For the stations, if they be far distant, it will be necessary that they should be high, and lie exposed to the sky; that there be no higher hill or part of the earth beyond them, that may hinder the distinctness of the characters,
TELEGRAPH.

ters, which are to appear dark against the sky, beyond them appearing white, by which means also the vapours near the ground will be pall'd over and avoided. Next, in choosing these flations, care must be taken, as near as may be, that there be no hill that interposes between them, that is almost high enough to touch the visible ray, because in such cases the refraction of the air of that hill will be very apt to disturb the clear appearance of the object. The flations being found convenient, the next thing to be considered is, what telescopes will be necessary for each flation. One of these telescopes must be fixed at each extreme flation, and two of them in each intermediate flation; so that a man for each glass, fitting and looking through them, may plainly discover what is done in the next adjoining flation, and with his pen write down on a paper the characters there exposed, in their due order; so that there ought to be two persons at each extreme flation, and three at each intermediate one, that intelligence may be conveyed backwards and forwards at the same time. Next there must be certain times agreed on, when the correspondents are to expect it; or else there must be a top at the top of a pole, in the morning, the hour appointed by either of the correspondents for acting that day.

"Next there must be convenient apparatus of characters, consisting of at least as many distinct characters as there are necessary letters in the alphabet, (to be made use of as is expressed in Plate Telegraph, fig. 1.) And these must be either day characters or night characters. If they are to be made use of in the day-time, they may all be made of deals, and of a size convenient for the several distances, any one of which characters may signify any one letter of the alphabet, and the whole alphabet may be varied 10,000 ways, so that none but the two extreme correspondents shall be able to discover the information conveyed. If the characters are for the night, then they may be made with lights, or lights disposed in a certain order, which may be covered or uncovered, according to the method agreed on. There will be also requisite several other characters, which may for express expedient express a whole sentence, such as 'I am ready to communicate; 'I am ready to observe.' I could influence a hundred ways of facilitating the method of performing the design with the more dexterity and quickness, and with little change, but that I think will be needless at present, since, whenever such a way of correspondence shall be put in practice, those and many more that I can think of at present will of themselves occur, so that I do not in the least doubt but that with a little practice all things may be made so convenient, that the same character may be seen at Paris, within a minute after it hath been exposed in London; and that the characters may be exposed so quick after one another, that a comma shall not much exceed the expounder in swiftness, and this not only at the distance of one flation, but of an hundred; for supposing all things ready at all of those several stations for observing and expounding as fast as the second observer doth read the characters of the first expounder, the second expounder will display them to the observer of the third station, whose expounder will likewise display them for the fourth observer, as fast as his observer doth name them to him or write them down. There may be many objections brought against this way of communication, because it has not yet been put in practice, but hardly any that may not be easily answered and obviated."

Dr. Hooke illustrates his invention thus: Let A B C (fig. 2.) represent three very long masts or poles erected, E the top piece that joins them together, D a screen, behind which all the deal-board characters hang upon certain rods or lines, and may, by the help of small lines connected with each of them, be exposed at F, or drawn back at D, as occasion may require.

This proposal of our ingenious countryman is very complete and well studied; it would be less convenient and expedient than the modern telegraphs, but would certainly have answered very useful purposes, with the advantage of being very free from the uncertainties and errors of more complete machines, which, at the same time that they admit of making a greater variety of signs than the letters of the alphabet, are for the same reason more liable to mistakes in exhibiting as well as in reading or translating them. The only obvious improvement on Dr. Hooke's telegraph is, that, instead of concealing the characters behind the screen D, they should be kept down below in the house on which the machine is to be erected, and be hoisted up into the frame when they are to be exhibited.

M. Amontons, an ingenious French academian who studied mechanics, was born at Paris in 1663, and died in 1705, at the age of forty-two. He proposed the following method: Let there be people placed in several stations, and at such a distance from each other, that by the help of a telecope, a man at one station may see a signal made in the next before him: he must immediately repeat the same signal, that it may be seen by persons in the station next after him, who are to communicate it to those in the following station, and so on. These signals may be as letters of the alphabet, or as a cipher, understood only by the two persons who are in the distant places, and not by those who make the signals. The person in the second station making the signal to the person in the third the very moment he sees it in the first, the news may be carried to the greatest distance in as little time as is necessary to make the signals in the first station. The distance of the several stations, which must be as few as possible, is measured by the reach of a telescope. M. Amontons is said to have tried this method on a small tract of land, before several persons at the highest rank at the court of France; but we are not acquainted with the kind of apparatus he employed; all that we know of his method is precisely the same as Dr. Hooke's.

Guyat, a long time after Dr. Hooke, proposed tables, with letters cut out in them; and Paulian, in his Dictionnaire de Phylique, describes a transparent figure, consisting of one perpendicular and three horizontal stripes, forming ten compartments, each of which can be rendered visible or invisible at pleasure, by blinds or shutters moveable from behind.

Mr. Richard Lovell Edgeworth, in a memoir which he presented to the Royal Society of Ireland (see their Transactions, vol. vi. p. 125.), adduces proof, that in 1767 he tried an experiment of the practicability of communicating intelligence by a swift and unfilected mode; and for this purpose he employed a common windmill, and arranged a system of signals, which could be made by the different positions of the arms of its sails, the canvas being removed from one or more arms, as was required. These signals were made to denote numbers, and both parties were provided with vocabularies, in which all the words were numbered.

French Telegraph.—Although the telegraph was thus fully explained in 1684, it does not appear that this valuable invention was at all practised or applied to any useful purpose until 1793 or 1794, when the events of the French revolution had directed all the energies of that ingenious people to the improvement of the art of war. A report made by Barrere to the sitting of the French Convention in August 1794, attributes the invention of the telegraph which they used to citizen Chappe.

"The new invented telegraphic language of signals is an artful
artful contrivance, to transmit thoughts in a peculiar language from one distance to another, by means of machines, which are placed at different distances of from twelve to fifteen miles asunder, so that the expression reaches a very distant place in the space of a few minutes. This is now brought to such a stature of perfection, that a correspondence may be conducted with Lisle, upon every subject and every thing: even proper names can be expressed: an answer may be received; and the correspondence thus be renewed several times a day. The only thing which can interrupt their effect is the weather, when the air is so very bad and turbid that the objects and signals cannot be distinguished. By this invention, remoteness and distance almost disappear, and all the communications of correspondence are effected with the rapidity of the twinkling of an eye. By its aid the operations of government can be very much facilitated, and the unity of the republic consolidated much more by the speedy communications with all its parts.

"The greatest advantage can be derived from this mode of correspondence, because, if thought proper, its objects need only be made known to certain individuals, or to one individual alone, or to the extremities of any distance; so that the Committee of Public Welfare may at present carry on a correspondence with the representative of the people at Lisle, without any other persons being acquainted with their objects. If Lisle was even besieged, we should know every thing at Paris that might happen in that place, and could fend thither the decrees of the Convention without the enemy being apprized of it, or able to prevent it."

M. Chappe's or the French telegraph is represented in fig. 4, which is made from sketches taken from the telegraph on the palace of the Louvre, at the time of its first establishment, and published in the Monthly Magazine, and other publications.

A is a beam or strong mast of wood, erected perpendicular from the centre of a cabin or small house situated on a rising ground: it must be about 15 or 16 feet high above the top of the house. C D is a balance-beam, jointed to the top of the mast, so as to be moveable on its centre, like a scale-beam. This balance-beam, which is called the long indicator, may be placed vertically or horizontally, or any how inclined, by means of strong cords, which are attached to the central wheel or pulley D, which has two grooves in the edge to receive the cords. The long indicator is about 11 or 12 feet long, and 9 inches in breadth; and at each extremity it carries secondary indicators F, G, which likewise turn upon centres or joints, by means of four cords, which are conducted through a hollow in the centre pin or axis of motion of the long indicator, otherwise the motion of the long indicator to put it into different positions, would derange the cords, and alter the direction of the secondary indicators, which are capable of being placed in any position with respect to the long indicator, by those cords being conducted by pulleys down into the cabin, and there attached to other mechanism, by means of which the whole machine is moved, and can be made to assume any of the positions represented by the small figures in the plate, in which positions it forms a variety of different characters, to denote the letters of the alphabet or numerals.

That the indicators may be very light, and at the same time oppose the least resistance to the wind, they are formed by frames, the interior parts of which are filled up by small oblique and separate boards, which however, being seen in front, appear contiguous. The ends of the small indicators are carried beyond the centres, and carry counter-weights to balance the weight of the indicators; but these ends and balances are made so as to be invisible at a distance.

It is easy to find the number of signals possible to be made with this telegraph: for if we consider the great indicator as being fixed, we shall find that each of the smaller ones may distinctly take five different positions: two where it makes a right angle with the great indicator; two where it makes an angle of 45°; and one where it falls back upon the great one, in which case it will disappear. Three other distinct positions might also be created; one where the small indicator would be horizontal with the great one, and two where it would make an angle of 135° with it.

The letter indicators then, considered as single movers, will furnish five times five, or twenty-five signals. As the great indicator is also a mover, there are twenty-five times as many signals as this indicator has distinct positions; and as it has but four distinct positions, one horizontal, one vertical, and two inclined, there are in all four times twenty-five, or one hundred signals.

The manner of using the telegraph was as follows: At the first station, which was on the roof of the principal pavilion of the Louvre at Paris, M. Chappe, the inventor, received in writing, from the Committee of Public Welfare, the words to be sent to Lisle, near which the French army was at that time stationed. Each of the telegraphs in the line employed three persons to work it: one to move the machine, which was done by a single motion of a winch, and could therefore be effected in a moment. A second person was employed with a telescope to observe the telegraphs of the two adjacent stations, to receive the communications, and to know by their signals, if they had understood the communication made to them, and also to receive the answers. The third person was employed to write down the observations made by the second person, and to give orders to the first. The stations were about three or four leagues distant, and an observatory was situated near the Committee of Public Safety at Belleville, to observe the last telegraph.

The grammarian can easily conceive that sixteen signals may supply all the letters of the alphabet; since some letters may be omitted, not only without detriment, but with advantage. These signs, as they were arbitrary, could be changed every week: so that the sign for B one day, might be the sign for M the next; and it was only necessary that the persons at the extremities should know the key. The intermediate operators were only instructed generally in imitating and repeating these sixteen signals, which were so distinct, and so marked, as different from the other, that they were easily remembered. The construction of the machinery within the house was such, that each signal was uniformly given in precisely the same manner at all times. It did not depend on the operators' manual skill, because the position of the arms could never for any one signal be a degree higher or a degree lower than was intended, their movements being regulated mechanically. M. Chappe, having received at the Louvre the sentence to be conveyed, gave a known signal to the second station, which was Montmartre, to prepare: at each station the observers with telescopes were on watch, and each telegraph immediately gave the signal of preparation which he had received; and this being communicated successively through all the line, all the machines were brought into a state of readiness. The persons at Montmartre then received, letter by letter, the sentence from the Louvre, which they repeated with their own machine, and this was again repeated from the next height, with inconceivable rapidity, to the final station at Lisle, where the observations were written down, and translated according to the key which had been before arranged to be used, either by previous concert, or by some particular signal made with the telegraph, to denote that key which was used.
TELEGRAPH.

taken up for each movement was about twenty seconds; of which the motion alone took up four seconds; and during the other sixteen, the telegraph was kept stationary, that it might be distinctly observed and written down by the people at the next station. The figures were sometimes made for words, and sometimes for letters: when in words, a small flag was hoisted; and as the alphabet could be changed at pleasure, it was only the corresponding person at each end of the line who knew the meaning of the figure. In general, news was given every day about eleven or twelve o'clock; but the observers were constantly on the watch, and as soon as a certain signal was given and answered, they began from one end to the other to move their machines. All the moveable parts were painted of a dark-brown colour, to be more distinctly visible when viewed against the bright sky.

Another line of telegraphs, from Paris to Landau, was completed in 1796: the first of them was erected on a pavilion of the palace of the Tuileries. The construction was more complicated than the first. A fixed black bar, fifty feet long, was supported horizontally by four uprights. This bar carried five indicators, similar to the smaller indicators of the machines before described. Two of the upright posts which supported the horizontal bar, carried each a similar indicator: in this way the centres of the indicators were all stationary, instead of having the long indicator with smaller ones at the extremities. These seven indicators were moved by pulleys, in the usual way; and there was none of the difficulty of conveying the communicating cords through the hollow axis of the central pulley. Each of the indicators could take seven distinct positions; viz. for those which were supported by the horizontal bar, two vertical, four inclined, and one horizontal; and for those indicators which were supported by the upright posts, one vertical position, four inclined, and two horizontal ones. The number of combinations which such a construction can make, is

\[ 7 \times 7 \times 7 \times 7 \times 7 \times 7 \times 7 \]

which gives the astonishing number of 823,543 signals. This number, which is eight thousand times larger than that of the signals of the first telegraph, is doubtfles more than sufficient: it, however, allowed them to abridge considerably the telegraphic language, and to transmit whole phrases at a time.

The English Telegraph.—M. Chappe's machine was known in England not long after it was set up, and two working models were made at Frankfort, and sent to England, by which the plan and alphabet became known; and its advantages were so obvious, that the British government tried various experiments on telegraphic communication, and at length lines were established from the Admiralty-office to Deal, Portsmouth, and other points of the sea-coast. These machines are upon the construction represented in fig. 3, not being made with indicators, like the French, to move upon centres into different positions, but with six octagon boards, each poled upon an horizontal axis, and supported in a frame in such a manner, that each can be placed vertically, and will then appear of the full size; or if they are placed edgewise, as shown at d, the narrow edge alone will be presented, and this at a small distance will be invisible. The boards are turned by means of cranks, r, upon the end of the axies, and from these, lines descend into the cabin below, where each has a handle, which is conspicuously marked with the letter or character which will be indicated when the handle is drawn down.

By the changes in the position of these six boards, thirty-six changes may be easily exhibited, and the signal to represent any letter may be made. By certain positions, a variety of other things may be signified, according to the will of the two persons employed at the two extremities in making the signals. Thus, one board being in a horizontal position, and the others flat, or in a perpendicular situation, may denote the letter a; two boards only being in a horizontal position may give the letter b; three in the same manner, the letter c, and so on. As there may be made as many changes with these boards as with the same number of bells, the letters of the alphabet may be made with ease, and a sufficient number of signals may be formed for extraordinary purposes.

This number of changes is sufficient; for as this telegraph is intended to convey information by representing the successive letters of each word, a greater number of changes than would express all the essential letters of the alphabet, the numerals, and three or four more signals, to signify repetition, period, error, &c. would be only embarrassing, and liable to error. It is a good system to spell every word, rather than attempt to communicate entire words or sentences, as by keeping always to one system, mistakes are avoided. The communication is itself so rapid, that it is more important to attain certainty in the operation, than to make any sacrifice for the sake of dispatch.

This telegraph was judiciously contrived to have a sufficient number of combinations, without having more than necessary. Five boards would have been insufficient, and seven more than were necessary. But there are several serious objections to it: the form renders it too bulky to admit of being baited to any great height above a building; and after all, the boards are less evident to the eye at a distance than the indicators of the French machine. The motions must, therefore, be nearer together, to render the bars of the frame visible as well as the boards. Neither can this telegraph be made to change its direction, but it can only be seen from one particular point. It was found necessary to have two telegraphs at the Admiralty, one for each line, and also at any point of the line where it branched off.

To enable the telegraph to be used at night, the first French telegraph which was set up was furnished with Argand lamps, but the English was never used in that manner. It would have required a great number of lamps; because it would have been necessary to have fixed lamps to indicate the points of the frame in which the boards work, as well as the boards themselves.

These two forms of telegraph, the French and the English, continued in use for some years. The French made frequent changes in the details of their system, though for a long time they preferred M. Chappe's machine; and when Buonaparte assumed the supreme command in France, the original machines were taken down. A number of machines were set up on various parts of the French coast, and were used in some of their campaigns: they were of a very temporary nature, and composed of the simplest materials, of masts and yards, with large balls at the end; the yards were inclined by cords, so as to direct the signals on the principle of M. Chappe's original machine. About 1826 a new set of telegraphs was established on the whole extent of the coast of the French empire, of which the following description is given by captain C. W. Pasley, in the Philosophical Magazine. See figs. 5 and 6.

Modern French Telegraph.—Every telegraph consists of an upright poll, R, to which are attached three arms, A, B, and C, exactly similar to each other, and each moving upon its own distinct spindle or axis. The axis of one of these arms, A, is near the head of the poll R; and the distance between the centres of motion of either of the two uppermost arms, and the centre of the one immediately below it, is rather less than double the length of one arm. The highest of the three arms, A, can exhibit seven different
TELEGRAPH.

tinct positions, as is shown by the dotted lines A 1, A 2, A 3, &c.; but the other two arms, B and C, can only exhibit fixed positions each, because they are hidden by the post when in a vertical position. The total number of combinations, or of distinct signals, which can be made by this telegraph, will constantly be three hundred and ninety-one; but as the arm A, when in the vertical position A 4, may appear to be part of the post, R, it is not safe to employ that position, and this will reduce the number of signals to three hundred and forty-two. As only three bodies are employed in this telegraph, it appears very superior to the Admiralty telegraphs used in England, which, by the combination of double that number of bodies, can only make sixty-three distinct signals. Captain Salley observes, that the mechanism of the French telegraphs just described, must be either imperfect, or the men employed in working them must have been very unskilful, for the signals were made and repeated in an awkward manner, with what seemed to him much unnecessary loss of time. But these defects, it will be evident, detract nothing from its merit as an invention. In regard to the mechanical construction, he could only observe that the arms, which were painted black, and appeared solid at a distance, were made in the fashion of a Venetian blind, in order, it may be presumed, to diminish the action of the wind in bad weather. Each arm had a counterpoise of thin materials painted white, which, unless the observer be very near the telegraph, becomes invisible.

Fig. 5. shows the telegraph in a state of rest, the dotted lines marking the several positions in which the arms can be exhibited. Fig. 6. is a specimen of the telegraph at work. Fig. 7. shows the construction of one of the arms on a larger scale, DE being the part which is fashioned like a Venetian blind, and EF the counterpoise.

Sir Home Popham's Telegraph at the Admiralty. — The original telegraphs at the Admiralty, with the fix boards, have been lately taken down, and a new kind substituted. It is on the same principle with the French, being an upright maff with two indicators, which move upon centres one above the other, in the manner of the dial described. The maff is made to turn round on its vertical axis, so as to present its arms successively to all quarters, when required. The mechanism, which is the invention of Sir Home Popham, is the best which has ever been contrived, the movements being very simple, and effected by iron spindles and endless screws, so that the indices below are certain to accompany the indicators exactly in their movements, and place them precisely in their required positions, which cannot be done by the old machinery with cords, because they are liable to expand and contract by wet or dry weather. The machinery for this set of telegraphs was constructed in the most substantial manner by Mr. Maudslay in 1816. (See figs. 8, 9, and 10.) LM is a tall maff of an hexagonal form, framed up from fix flink planks put together at the angles, and bound by iron hoops at different places, so as to be hollow within. The lower end, L, terminates in a pivot, and the maff is retained in a vertical position by a circular collar at O, which embraces it, and is supported in the roof of the building. The two arms, PM and QR, are movable upon centres, one at the top of the maff and the other half way down. When the arms are placed in a vertical position, they shut up within the hollow of the maff, so as to be entirely concealed; and for this purpose, two of the fix lides are cut away at the upper part, so as to leave an opening through the maff of sufficient width to admit the two arms to work in it. To communicate motion to the arms, a small toothed wheel is fixed upon each arm at the centre of motion, and close to the side of the arm. The teeth of these wheels are actuated by endless screws or worms, formed on the upper ends of the long spindles d and f, which descend down to the bottom of the hollow maff, and have small bevelled wheels upon them, which are actuated by wheels of similar size, fixed on the ends of short horizontal spindles, which have handles, f, g, applied at the extremities. (See fig. 11.) By turning these handles, motion is given to the vertical spindles d and f; and by means of the endless screws upon the upper ends of them, the wheels at M and R, on the centres of the arms, are turned round, and the arms are put into any required position. But in order that the people below may at all times know exactly what positions the arms stand in, two dials, m and r, are formed on the lower part of the maff, the upper one, m, being for the upper arm M, and the other, r, for the lower arm R; and each dial has an index or hand, which turns round with a motion exactly corresponding to the motion of the arms. For producing this motion, the axe of each hand or index has a small toothed wheel, m/ or r/, (fig. 11.) fixed upon it in the middle; and an endless screw is formed upon the upright spindle to work in the teeth of the wheel. The wheels upon the centre of the arms, and those upon the axes of the indices, have the same number of teeth; and as every turn of the spindles and screws will move the wheels round one tooth, the angular motion of the arms, PM and QR, and the hands, m and r, will in all cases be the same.

The dials are each divided into eight, corresponding with the eight positions in which the arms are to be exhibited: viz. pointing vertically; 1st, upwards; and 2d, downwards: pointing horizontally; 3d, to the right; and 4th, to the left: pointing upwards at an inclination of 45 degrees; 5th, to the right; and 6th, to the left: pointing downwards at an inclination of 45 degrees; 7th, to the right; and 8th, to the left. But of these eight positions, only the four last are made use of to represent characters; because, in the two vertical positions, the pointers enter within the maff, and cannot therefore be seen whether they are pointing upwards or downwards: the horizontal positions of the arms are reserved for the necessary signals of preparation, &c. Each arm, then, has four positions, in which it will express different signals; and these positions are all made with the pointer, at an inclination of 45 degrees from the horizontal line.

These signals either express the letters of the alphabet, or the numeral characters, according to previous arrangement, which must be made known by exhibiting a preparatory signal, before the communication is begun. The signal to prepare for receiving letters is the lower arm extended horizontally to the right; and for the numerals, both arms are extended horizontally to the left.

The upper pointer, PM, used by itself, at an elevation of 45 degrees, denotes,

- A, or 1, when pointing upwards to the left.
- B, or 2, when pointing downwards to the left.
- C, or 3, when pointing upwards to the right.
- D, or 4, when pointing downwards to the right.

The lower pointer, QR, used by itself, at an elevation of 45 degrees, denotes,

- E, or 5, when pointing upwards to the left.
- F, or 6, when pointing downwards to the left.
- G, or 7, when pointing upwards to the right.
- H, or 8, when pointing downwards to the right.

It is easy to conceive, that, by repeating all these positions with both arms exhibited together, instead of one singly, various combinations may be made, which are sufficient
icient to express all the remaining letters, and some other necessary signals.

The dial for each arm is double; that is, a dial is fixed at each side of the mast, and the axes of the indices or hands proceed quite through the mast, so as to have a hand at each end. These dials are not numbered exactly similar to each other, but are reversed; and the two indices on the opposite ends of the same axe, though they point in one direction, do not indicate the same numbers on the two dials; because each dial is adapted to indicate the meaning which the different positions of the arms will have, when the telegraph is viewed on that side to which the dial faces.

For when a signal is made, that arm which projects from the right-hand side, if the telegraph is examined on one side, will project on the left hand, when the telegraph is viewed on the other side.

It was before stated, that the telegraph can be turned round, so as to present its arms to any direction. This is done by the pivot, L, at the lower hand; but to hold it fast in the desired direction, a circular iron plate is placed on the floor, with holes in it; and a bolt, W, is fitted into two eyes, which are fixed to the axle of the mast. The point of this bolt drops into any of the holes in the plate, and thus holds the mast firm; but if the bolt is lifted up, to draw its point out of the holes, it can be turned round. The arms are made with boards, like Venetian blinds; and each has a piece of cast-iron at the opposite end, to counterpoise the weight, and make the arm move freely into all positions.

Since the telegraph has been brought into actual use, its great utility has been obvious; and many ingenious persons have studied the means of simplifying the methods of representing the signals, with a view to obtain the greater facility and rapidity of communication. This would enable us to avoid the danger of mistakes, by being able to repeat the whole communication several times, which at present is tedious. Many of these contrivances display great ingenuity; but it appears to us, that the defects or difficulty of communicating detailed intelligence by means of telegraphs, arises from the complicated construction of all the languages at present in use, rather than from any defects in the machines, which have been proposed to exhibit the symbols; and that to perfect telegraphic communication, it would be necessary to invent a new and more perfect language, which would be a most valuable acquisition, to facilitate all other modes of communicating ideas.

All languages originated in a rude state of society, and were at first limited to the expression of very simple ideas. As men advanced in civilization, they found the necessity of increasing the number of their words; and to enable them to express more complex ideas, compound words were occasionally introduced; but, in all cafes, knowledge must have made a considerable advance, before any arrangement or classification of words was imagined; because the necessity of any grammar would not be discovered, until the number of words was so multiplied, as to render the use of them troublesome, and liable to confusion. Before a system of grammar was established, no improvements could be made in a language, except by the addition of new words; and every such addition must have introduced new difficulties in the use of the language. Even when a system of grammar is completely established, as is now the case in all the languages of civilized nations, the number of words which were invented, or introduced without any system, is so considerable, as to prevent that perfection of expression which might be obtained, if the language had been wholly constructed in an advanced stage of society. There is no doubt but a new language might be contrived, which, with a very small number of words, compared with any of the known languages, might express all ideas in a much more expeditious and definite manner than they do. In oral communication, this defective construction of language, and the want of precision, is little experienced, unless by those who begin to learn a foreign language; because the extreme rapidity of expression enables us to amplify and enlarge upon any subject, so as to elucidate any words or phrases which are not directly applicable to the expression of an idea to be communicated, or which are at all indefinite. In writing or reading, the deficiency of language is more observable, from the great difficulty of expression and communication. But when we attempt to converse by signals, we experience in its full force the great complexity of language, and find that it becomes a tedious operation to represent a sentence clearly by signals, which is spoken or written in a moment; and this must continue to be the case, even if the mechanical operation of exhibiting the signals is reduced to the utmost possible simplicity. As no such scientific language as that which we hint at has been perfected, we must content ourselves to find the best means of communicating our ideas by signals, which shall indicate the letters and words of our present languages; and this may be done in two ways: first, by characters or signals, which shall either express the letters of the alphabet, or words, or, in some cases, complete sentences. The other method is to exhibit signals, which shall indicate numbers; and these numbers can be translated into words, by means of a dictionary in which every word is numbered. The telegraphs which we have described are of the former class, and we have explained the manner of using them; but the latter kind requires a greater variety of signals, because they must be capable of making as many signals as there are words in the language in which the communication is intended to be made. There is some difficulty in making a telegraph so universal as this requires, otherwise the numerical method has decided advantages, in the convenience with which it can be carried on by means of a common dictionary, alphabetically arranged, and in which each word is regularly numbered from one end to the other. In this any word can be instantly found, by its place in the alphabet; and the number corresponding to it being exhibited by the telegraph, and observed by the opposite party, he can as quickly find out the same word in the dictionary by means of its number.

The numerical method is perhaps the easiest of all others, and may be exhibited by fire and smoke in the simplest manner, without any telegraph or complicated apparatus being made for the purpose.

The meaning of a signal is ascertained by the continuance or disappearance of fire and smoke at a different place. In the day-time, the smoke on a particular hill may give notice to an observer on the next hill, that a communication is to be made; he of course will answer it by smoke, to show that he is upon his watch. The smoke will then disappear on both hills, by a cover being placed over the fire; which, being taken off and put on again repeatedly, will give a succession of clouds of smoke rising at proper intervals in the air. The observer notes the number of times that the smoke rises without a considerable interval, supposing three times; and he then writes down the number 3. After a more considerable interval, determined by the parties, the smoke rises again, we will suppose four times; he writes down the number 4. He has now the number 34 to communicate by signals to the next post. At night this is done by a successive appearance and disappearance of fire.

As the number denoted by the successive appearance of smoke
TELEGRAPH.

smoke or fire, or firing of guns, may, if it is a large number, be liable to mistake, a learned professor in Germany proposed to shorten the numbers employed, by using a quaternary instead of the decenary arithmetical. Thus, according to his system, the units were to be placed as in common arithmetical; a figure in the next place, to the left, instead of denoting the number of tens, was a multiple of 4, denoted by the figure, that is, it denoted the number of fours to be expressed; in the third place, the figure denoted the number of sixeens instead of hundreds; and the fourth place of figures would be sixty-fourths instead of thousands; and so on. E. g., to write down 95, he placed his figures thus: 113 3; the 3 in the place of units denoted 3; the next 3 denoted $3 \times 4$, or 12; the third figure, 1, denoted $4 \times 4$, or 16; the next figure, 1, denoted $4 \times 4 \times 4$, or 64; consequently 1133 in the quaternary arithmetical, was equivalent to $64 + 16 + 12 + 3 = 95$ in the common decimal numeration. The advantage proposed by this changing the figures was, that in making the signals 95, there must be fourteen firings, or appearances of smoke, which, in the other mode, is done by eight firings. In this arithmetical, a greater number than four never appears; and there is less danger in miscounting to form a number. Some of the numbers in the dictionary must be denoted to the single letters of the alphabet, as it is by means of them alone that proper names can be made out.

Mr. Edgeworth, who, we believe, first introduced the numerical system of communication, gives the following account of its advantages, in point of facility, over the alphabetical method, which is a great object in telegraphic communication. Although the alphabet may be varied at pleasure, and any arbitrary signs employed, yet these are possible to be deciphered by rules which depend upon the usual arrangements of letters: thus, for instance, a single character being exhibited as a word, must, in the English language, be either A or 1. The proportion which exists between the number of words of one, two, three, or any greater number of letters, can be claffed in catalogues, and from these the monosyllables of any cipher are easily obtained; and from the letters of these monosyllables, the letters of longer words are discovered. By similar rules, some of which are very ingenious, and depend upon the philosophy of language, any alphabetical cipher may be easily unfolded. (See Cipher.) But these rules, excepting a few of them, are useless, when ciphers are employed to denote entire words; and the most obvious mode of discovery may be avoided, by omitting those common words which occur most frequently in every language, as the, and, that, to, &c.; and even supposing that, from its frequent recurrence, any word should be discovered, no progress can be made from such data, for the cipher of any word is an isolated fact which leads to nothing farther.

Suppose the knowledge of any particular vocabulary should fall into hands for which it was not intended, a slight change in the numeration, without any actual change of the figures, would prevent discovery; for instance, suppose it is settled between the parties, that 6, or any other number, is to be added or subtracted from the numbers which are exhibited before referring them to the vocabulary. The advocates of the numeral system state, that a letter can be communicated much quicker by signals which express words, than by signals which express only letters. Words may be forwarded as fast as they can be looked out in a dictionary, and even faster, whilst only an equal number of letters could have been communicated by the alphabetical mode. Another alleged advantage resulting from the use of words in the telegraphic correspondence is, that the words of the same meaning in different languages having the fame number attached to each, a correspondence could be carried on from one language into another, which, though not grammatically correct, yet would be sufficiently intelligible. Proper names must be spelt, which may easily be done, every letter having a corresponding number.

Mr. Richard Love Edgeworth, in the Transactions of the Royal Society of Ireland, vol. vi. p. 125, has described his telegraph, which is simple, and admits of very numerous combinations: it is intended to represent numbers to which words may be referred.

The machinery consists of four indices or pointers, each capable of revolving on a centre or axis, so as to assume different positions. The shape of each pointer is that of an isosceles triangle, of which the base is rather less than half the perpendicular. The four pointers are placed in a row, as shown by fig. 12, and, as in common numeration, the right hand represents units; the second from the right, tens; the third, hundreds; and the fourth, thousands. It is easy to distinguish whether a hand moving vertically, points perpendicularly downwards or upwards, horizontally to the right or left, or to any of the four intermediate situations; this produces eight positions, which can be made by each pointer; but of these eight positions, seven only are employed to denote figures; the upright position of the hand or pointer being referred to represent 0, or zero. The figures thus indicated refer to a vocabulary, in which all the words are numbered. Telegraphs of this kind, which are to be fixed at permanent stations, which may be shown clearly with tolerable glances at twenty miles distance, are to be mounted on stone or wooden pillars, sixteen or twenty feet high; four of which must be solidly erected in a row; and on the top of each a moveable circle or platform turns horizontally upon a centre, in the manner of a moveable windmill head. Across the platform an axis lies horizontally, and carries the arm or pointer, fixed vertically at one extremity of the axis, whiff, at the other end, are eight handles to turn the pointer round by. The handles are fixed in their different positions by a catch or alidad. By means of the platform, the pointer may be turned to any part of the compass; and as one side of it is painted black, and the other white, either side may be employed, as the colour of the clouds, or the situation of the place, may require.

In managing a correspondence by these machines, it is necessary to have certain signals established; nor are these signals merely arbitrary; it is absolutely necessary that they should be made by the two external pointers of the row, viz. units and thousands; or by the two internal pointers, viz. tens and hundreds; else they could not be repeated by the intermediate stations without confusion; because, in the middle stations, that pointer which represents thousands, when conveying a message eastwards for instance, must, when an answer is returned to an opposite direction, represent units. The same change will take place between the pointer that denotes hundreds and tens.

When any communication is to be commenced, the pointers that denote thousands and units are to be whirled round till the same is done at the corresponding station.

When this signal has been anwered, the person who gave it proceeds to send his intelligence. As soon as he begins, the pointer of hundreds at the opposite station is turned to 2, and kept in that position till the word is made out from the vocabulary; the pointer is then turned round to 0, or zero. The person who is speaking, when he perceives by this signal that he is understood, turns all the machines to 0, which is always to be done at the end of every word.

When all his machines are in this position, his correspondent again turns his pointer belonging to the place of hundreds to 2, to shew that he is ready to receive the intelligence, and
it is to remain there till he receives another word, and so on, till all that is meant to be said is finished; the pointers of thousands and units are then to be vibrated backwards and forwards, with the points downwards, like pendulums, till the fame is done at the opposite station.

If any interruption takes place on either side from a cloud, or shower, or any accident, it is to be indicated by vibrating thousands and units, with their points upwards; which signal must be repeated from the opposite station; and whoever has made the signal of interruption, must make the signal of recommencement, when he is ready to proceed. This signal is by vibrating hundred and two, with their points upwards, and when this is answered, (but not before,) the business may proceed. It should be observed in general, that every signal should be acknowledged by the party to whom it is addressed.

The vocabulary corresponding with the numbers denoted by this machinery is composed of a large book, or, with mahogany covers, framed, to prevent them from warping. Its size, when opened, is 47 inches by 21; it consists of 49 double pages, that is to say, each sheet is folded in the middle, and when it is opened forms one page.

The book is divided into seven parts by thin slips of mahogany, which serve to open it easily at each of these divisions, every one of which contains seven pages, and each page forty-nine words. No more than forty-nine words are contained in each page, because the numbers 8 and 9, and zero, are not admitted. This omission arises from the Structure of the machine, which points only to even numbers, referring 0 for a point of rest, at which point the hands indicate nothing. In every hundred, therefore, only forty-nine numbers are used; and in every thousand, only even hundreds are counted. Each division of the book, separated by the mahogany rulers, contains all the efficient numbers in seven hundred. Each of these rulers projects beyond the sides of the pages, and is numbered in succession from 1 to 7; and they are so placed below one another, as to permit the numbers on all sides of them to be seen at once, as in the figure.

When any number of thousands is pointed out, it can, by means of these rulers, be immediately selected: the series of seven pages, which one of these rulers opens, is cut, like the alphabet of a ledger, at the edge in seven divisions. By these means, the page containing the hundred which is wanted is instantly found. In the page thus obtained, the tens, from 10 to 70 inclusive, are divided from each other, so as to be instantly distinguishable, and the units under, each division in like manner selected. This is a specimen of the seven lines of the first page, and though it is but one-twelfth of the real size, it is sufficiently distinct. Its contents are divided into eight classes, the words in each class being numbered downwards, from 1 to 77, omitting all cyphers, or zero, and all eights and nines. When once the class required is ascertained, any number in the page can be found immediately. As for instance, the reader will easily select Class VII. No. 11, Clas IV. No. 15, and so of the rest. Nothing remains to be explained but the manner in which the classes in each page is pointed out by the machinery. For this purpose, before the pointers are turned to any set of figures, the pointer that represents thousands is turned to the class that is wanted, and as soon as the correspondent answers this signal, thousands is returned to 0. Then all the pointers are moved to the places which denote the figures required for any word or sentence. When the class is thus ascertained, an index, which slides on the mahogany cover of the book, is set to the column belonging to this class. When an observation is made, the number of thousands can be opened by the ruler. As soon as it is read off by the telecope, the number of hundreds is opened by the pages, where they are cut away, and the number of tens and units is seen on the page. As the pointers are moved in succession from thousands to units, the different divisions of the book can be opened as fast as the pointers are moved.

Specimen of the Vocabulary belonging to Mr. Edgeworth's Telegraph.

|--------------|-------------------|--------------------------|------------------|------------------|---------------|--------------------------------|--------------------------|

The principal objection to Mr. Edgeworth's machine is, that it would be of a vast size, and each pointer would require a man to work it. He describes, at the end of his paper, a portable machine, which is made of fpars and poles jointed together, and braced by cords. We think the second kind of French Telegraph, which was set up between Landau and Paris, would answer the purpose very well; it has five indicators, and the movements are made by machinery in the house below.

Major C. Le Hardy, in the Transactions of the Society of Arts for 1808, vol. xxvii, has described a telegraph which is well adapted for exhibiting signals which shall indicate numbers. It has four indices or pointers, each consisting of a long arm, carrying a square index-board or pointer at the extremity. One of these pointers represents units; the second, tens; the third, hundreds; and the fourth, thousands. All the four indices move on a common centre by the machinery; and to distinguish them one from another, each board is placed at a different distance from the centre of motion, so that in their motion they describe four circles of different radii. The position of the arm, with respect to the horizon, is made to indicate the number which is to be expressed by each index respectively, and there are ten different positions for each, answering to the numeral characters.

To identify these ten positions, a large frame is fixed close behind the pointers, parallel to the plane of their motion; and
and this frame supports ten radial bars, which diverge from
the common centre of motion. The radii are again inter-
sected by other bars, forming four concentric arcs of
circles, each corresponding in radius with the length of one
of the four pointers or signal-boards. By means of the
radii, the positions of the pointers, and their corresponding
numbers, are read off, whilst the arcs serve to distinguish
the different pointers of units, tens, hundreds, and thousands,
because they always shew the length of the arms from the
centre. By this machinery, 10,000 can be exhibited; and
for higher numbers, there are two square signal-boards,
which can be turned so as to be invisible or visible at pleasure;
one represents 10,000, and the other 20,000, and both toge-
ther 30,000, either of which numbers is to be added to the
number shown by the arms, according as these signal-boards
are exhibited. By this addition, this telegraph can exhibit
as high as 40,000.
The frame with radial bars is a good method of reading
off the exact position of the arms; and it is so much more
certain than trusting to the eye alone, that by its aid the
arms may be shewn in a much greater number of positions;
still, if each arm is distinctly capable of exhibiting ten signals,
it will be sufficient for the numeral method. Mr. Edge-
worth's pointers, as we have seen, were only capable of
eight positions for each; and this obliged him to mutilate
the system of numbers, by taking away all the eights, nines,
and zero.
The dial-plate of a clock has been proposed as a model,
and would make a most excellent telegraph, as it might
exhibit 144 signs, so as to be visible at a great distance.
The dial should only be divided into six divisions instead of
twelve; and this being raised twenty or thirty feet above
a building, and the indices and the dial being painted with
very distinct colours, would be clearly visible. The dial,
if supported on one poll, might be always turned to the
direction in which the information was to be conveyed.
In the Supplement to the Gentleman's Magazine for 1794,
a telegraph is described, which consists of a semi-circle
placed in a vertical position on a strong stand. The circum-
ference is divided into twenty-four divisions, which are ren-
dered visible by circular holes cut through the semi-circle.
In the centre is an index, which can successively be brought
to point out any division, very much in the manner of the
dial of a clock. In the night-time each division is to be
furnished with a lamp, and the index is made sufficiently
broad to eclipse or hide any of the lamps at pleasure to
which it is turned, and by this means the letters of the alphabet
are to be designated.
Mr. Garnet's Telegraph.—Of all the proposals for making
a variety of signals by the different positions of an index or
pointer which moves on a centre, the following is the most
certain as to the identity of the positions, and hence it admits
of the greatest number of signals from each pointer. It has
also a farther advantage, that there is no necessity for any
frame or dials, like the three last described machines, which,
as their divisions are intended to be observed at a distance,
must be exceedingly large. The pointer or indicator of
Mr. Garnet's machine is the same as the foregoing, and its
different positions represent different characters or letters:
its length should be two and a half or three feet from the
centre, for every mile of distance. The distant observer
can find out, and exactly read off these positions by a wire
fixed across the eye-piece of the telescope with which he ob-
serves, which eye-piece turns round on the end of the tube
of the telecope, so as to bring the wire to be parallel to, or cor-
respond with the distant pointer. This is as easy to do as
to look through the telescope.
The index or pointer has a small circle fixed on its axis
of motion, and turning round with it. This circle is divided
into twenty-four divisions, or even more, and each division is
lettered with a letter of the alphabet. A fixed index is also
provided, to which any letter on the divided circle can be
brought by turning the pointer round, and this determines
the position of the pointer. Or, instead of an index, the
divided rim of the circle may be concealed in a box, with
a hole at one side just sufficient to see one letter or division at
a time, and then there can be no mistake in setting the
pointer. The eye-piece of the telescope is to be made to
turn round upon the end of the tube, and is to have a circle
fixed upon it similarly divided and lettered. A fine wire
is also to be stretched across the centre of the eye-piece in the
focus of its lenses; and there must be likewise an index or
mark on the telescope, to read the divisions of the circle on
the eye-piece. If this circle be likewise enclosed in a box,
having a hole to see only one letter at a time, there will be
less danger of mistake.
The instrument being correctly adjusted, it is obvious
that (the eye-piece of the telescope being turned round till
its wire covers or becomes parallel to the distant pointer)
the index on the telescope will point out the fame letter on
the divided circle of the eye-piece, as is indicated by the
index and circle of the distant pointer; hence the two parties
have the fame letter or character presented to them by their
respective instruments.
The idea of reading the signals by means of wires on the
eye-piece of the telescope is very valuable, and promises
many advantages. In intermediate stations, there is always
danger of confusion in making signals to parties in both di-
rections; because an arm which inclines towards the right
when the telegraph is viewed in one direction, in an op-
posite direction will appear to incline to the left, and
indicate a different thing: hence it is always necessary for
the parties to be informed, by a previous signal, in what
direction the communication is to be made, that the ob-
servers, when they see a signal made, may know whether it
is intended for them, or for the next station beyond. Now
when the telegraph is used, if the circle of each telescope be
figured to correspond with the circle of the pointer which is
to be observed with it, all signals will become intelligible to
any party who observes them.
The Rev. John Gamble suggested a form of telegraph,
which consisted of four arms, each ten feet long, and fur-
nished with a circular board at the end. All the four moved
upon a common centre of motion, and independently of each
other, so that one, two, three, or four, could be exhibited
at different degrees of elevation with respect to the
horizon, or with respect to each other, so as to afford a
great number of signals. One of these was erected in 1803
upon one of the towers of Westminster Abbey, but has long
been removed. About the time when telegraphs were first
used, this gentleman published a small pamphlet, entitled
"Observations and Telegraphic Experiments," which
contains some good ideas.
Nocturnal Telegraphs.—In 1801, Mr. John Boaz of Glaf-
gow obtained a patent for a telegraph, which effected the
signal by means of twenty-five Argand lamps. These
were arranged in five rows, with five in each row, so as to form a
square. Each lamp being provided with a blind, with which
its light could be obscured, the lamps could be made to
exhibit letters and figures, the same as Dr. Hooke's charac-
ters, by leaving such lamps only visible as were necessary to
form the character. The machine is described in the
Repetory of Arts, First Series, vol. xvi. p. 223; and in the
Philosophical Magazine, vol. xii. p. 84.
TELEOLOGY, formed of τέλος, end, and λόγος, discourse; the science of the final causes of things. This is an ample and curious field of inquiry, though pretty much neglected by philosophers.

TELEPHIANES, in Biography, a celebrated performer on the flute in the time of Philip of Macedon. According to Pauflanias he was a native of Samos, and had a tomb erected to him by Cleopatra, the sister of Philip, in the road between Megara and Corinth, which was subfifting in his time. The epitaph upon this musician, which is preserved in the Anthologia, equals his talents to those of the greatest names in antiquity.

"Orpheus, whom gods and men admire,
Surpass'd all mortals on the lyre:
Neath with eloquence could charm,
And pride, and insolence disarm:
Great Homer, with his heavenly strain,
Could soften rocks, and quiet pain:
Here lies Telephanes, whose flute
Had equal pow'r o'er man and brute."

Telephanes was closely united in friendship with Demophilus, who has made honourable mention of him in his harangue against Midas, from whom he received a blow in public, during the celebration of the feast of Bacchus. As this was a kind of musical quarrel, we shall relate the cause of it.

Demophilus had been appointed by his tribe to furnish a chorus, to dispute the prize at this festival; and as this chorus was to be instructed by a master, Midas, in order to disgrace Demophilus, bribed the music master to neglect his function, that the chorus might be unable to perform their several parts properly before the public, for want of the necessary teaching and rehearsals. But Telephanes, who had discovered the design of Midas, not only chastised and dismiffed the music master, but undertook to instruct the chorus himself.

TELEPHIUM, in Botany, Dill. Eth. 375, fo called by Vaillant, from its resemblance to Telephium. See TELEPHIUM.

TELEPHIOIDES, Tourn. Cor. 50. t. 485. Dill. Eth. 377. t. 282. See ANDRACHNE.

TELEPHIS, in Ancient Geography, a town of Asia, in greater Armenia, situated in the vicinity of the river Phasis.

TELEPHUM, in Botany, a name adopted from Dioecorides, who θελφιος the plant we are about to describe, was supposed, by Imperato, Clusius, and most authors, to be Dr. Sibthorp however satisfied himself that the plant of Dioecorides was Cernitae minor, and possibly also the effera of Wilkewenow. To this conclusion he was led, first, by the authority of the famous old manuscript with drawings, at Vienna; and next, by observing that C. minor is particularly common in Greece among vines in the spring, as well as in other cultivated ground; as Dioecorides relates of his θελφιος. The yellow colour of the flowers also answers to his description, which our Telephum, in that point, does not, nor did Dr. Sibthorp observe the latter in any part of Greece.—Limn. Gen. 149. Schreb. 201. Willd. Sp. Pl. t. 1. 1506. Murt. Mill. Diet. v. 4. Alt. Hort. Kew. v. 2. 173. Jull. 313. Tourn. t. 128. Lamarck Illutr. t. 213. Garert. t. 129.—Claus and order, Penan- dria Trigynia. Nat. Ord. Holcerae. Limn. Portulaeae. Jull. Gen. Ch. Cal. Perianth inferior, of five oblong, obutic, concave, keeled leaves, the length of the corolla, permanent. Cor. Petals five, oblong, obtuse, erect, tapering downwards, inserted into the receptacle. Stam. Filaments five, awl-shaped, shorter than the corolla; anthers incumbent. Pif. German superior, triangular, acute; style none; stigmas three, acute, spreading. Peric. Capsule short, triangular, of one cell with three valves, and a central unconnected receptacle, half as long as the capsule. Seeds numerous, roundish-kidneyshaped.

Eff.
Calyx of five leaves. Petals five, inserted into the receptacle. Capsule with one cell, three valves, and many seeds.


Found by Shaw in Barbary. Nothing is known of this species but from his rude figure, and short description. The leaves are elliptic-oblong, above an inch in length; the lower ones stalked. Tops of the flowering branches recurved, as in the Heliotropium. Petals small. Capsules of three valves, with many seeds; so that there seems no doubt of the genus.

Telephium, in Gardening, furnishes a plant of the small hardy perennial kind, of which the species usually cultivated for garden use is the true orpine (T. imperati).

Method of Culture.—This plant is increased by fowing the seeds in the autumn or spring, in dry light mould, either where the plants are to remain, or in beds to be afterwards planted out. They appear in the spring, when they should be kept clear from weeds, and they will flower the following year.

It is also capable of being increased sometimes by offsets, slips, or cuttings, planted out in the spring season.

It likes a dry light soil, in which it grows best and lasts longest. The plants afford variety in the common borders and clumps when placed in the fronts of those parts.

Telephium, a malignant dangerous ulcer. The term is derived from Telephus, who was wounded by Achilles, and whose wound, it is said, became before he died a disease of the above kind.

TELEPHORUS, in Entomology, the Necydas Car-<br>dalelics, which see.

TELESCOPE, from τελις, at a distance, and σκοτις, I see, is an optical instrument that enlarges the visible angle subtended by a distant object, and thereby is said to magnify it, so as to render it visible to the eye of an observer. This property of making distant objects appear close to the eye, never fails to excite the surprise of every one who looks through a telescope for the first time; but few, comparatively speaking, have their curiosity fully gratified, as it regards the means by which this wonderful phenomenon is effected.

They are told, that the tube through which they look, contains magnifying glasses, or polished specula, which, by a peculiar arrangement, produce the surprising effect they witness, and there the explanation usually ends; but it is our province to give our readers a better account of this astonishing instrument, which we propose to do in a systematic manner, first by giving a short history of its invention and improvements; secondly, by giving a popular explanation of the theory of the dioptric construction, including the doctrine of aberrations; thirdly, by explaining the theory of the cata-dioptric construction; fourthly, by describing the most approved instruments, with reference to the drawings that represent their figures on their respective flaps; fifthly, by shewing how their magnifying powers may be measured by diameters, and varied by different arrangements; and lastly, by exemplifying their uses in measuring small angles and their corresponding terrestrial distances.

But before we proceed further with this subject, we must request our readers to peruse the articles ABBREVIATION, CATOPTRICS, DIOPTRICS, LENS, MIRROR, REFLECTION, REFRACTION, and SPECULUM, in the preceding volumes of our work, in order that we may not have occasion to repeat what would otherwise have been necessary to be introduced in this place, to render our account sufficiently full, particularly in that part of it which relates to the theory of single lenses.

1. The History.—The invention of the telescope, which was one of the noblest that modern ages can boast of, has enabled man to raise his eyes far above the surface of the globe he inhabits, in search of worlds that were invisible to the unaided eye; and the more perfect his instrument is made, the more celestial bodies he discovers scattered through the immensity of endless space. Whether this invention was casual, or the offspring of ratiocination, cannot perhaps be positively affirmed from any existing document; but the probability is, that it was in a certain degree casual: leaves of both the concave and convex formation were used separately to affiit the human eye, antecedently to the construction of any telescope; and the general belief is, that some accidental placing of two lenses, one convex and the other concave, of different focal lengths, at such distance from each other, that the rays tranmitted through them formed a picture on the retina of the eye, led to the discovery that they possessed the wonderful property of rendering a distant body apparently more large, and consequently more near, than it will appear to the unaided eye, or to an eye using any single lens whatever: this discovery, once made, would obviously lead to the construction of an instrument, in which this simple combination of two lenses would be the basis.

The honour of having constructed the first telescope, which was no doubt of the dioptric or refracting sort, (from διοπτης, a perspective instrument,) has been attributed to various inventors, several of whom may have been equally entitled to the claim of originality, though only one can be considered as the first inventor. We profes not to be in possession of better information on this subject than our predecessors were, and therefore shall satisfy ourselves with the enumeration of those persons who appear to us worthy of being put on the list of competitors for the honour of this noble invention. Mr. W. Molyneux has asserted, in his "Dioptria Nova," that our countryman Friar Bacon well understood the nature of all sorts of optical glasses, and how to combine them so as to form some such instrument as the telescope; and Samuel Molyneux, the son, has affirmed, that not only the invention but construction of a telescope is fairly attributable to Bacon, as may be collected from various Latin phrases in his Opus Majus; and Dr. Jebb, who edited this work, adduces a passage from Bacon's manuscript, to prove that he actually applied telescopes to astronomical purposes so long ago as in the 13th century; the friar having died in the year 1204.

The passages to which Mr. Molyneux refers, in support of Bacon's claims, occur in his Opus Majus, p. 348, and p. 357. Jebb's ed. 1733. The first is as follows: — "Si vero non sint corpora plana, per quibus visus videt, sed speculo, tunc est magna diversitas: nam vel concavitas corporis est versusculo vel convexitas?" whence it is inferred, that he knew what a concave and convex glass was. The second is comprised in a whole chapter, where he says, "De
TELESCOPE.

Dr. Smith, however, who must be considered as having been a competent judge of this subject, was unwilling to allow the inference that Bacon actually made a telescope, and conjectures that he only conceived in his mind how such an instrument might be constructed; which, by the bye, is still allowing the invention, though not the construction, to have been his. But be this as it may, we find no further notice taken of any such instrument as a telescope until about the year 1560, when John Baptista Porta, a Neapolitan, is said by Wollius to have made a telescope; but the description he gave of his invention in his Magia Naturalis is so defective, that Kepler declared it unintelligible; neither does it appear that this telescope was used in any celestial observation. Soon after this time, viz. in the year 1579, according to the account of Thomas Digges, in his Stratificos, his father, Leonard Digges, had learned from a manuscript book of the learned Bacon, how to discover objects at a distance, by perspective glasses set at due angles, when the sun shone upon them; but it is not evident whether the construction resembled that of a telescope or of a camera obfcura, nor whether it was of the dioptric or catoptric kind.

According to Descartes, James Metius, while amusing himself with making mirrors and burning-glasses, happened to look through two lenses, one concave and the other convex, placed by accident at a proper distance from each other, and thus discovered the property that such a combination of glasses produces of seeing objects at a distance; this discovery is said to have been near the end of the 16th century. The same discovery has been also attributed to John Lipperheim, a maker of spectacles at Middelburgh; but Borelhius, in his book entitled "De vero Telescopii Inventore," makes Janfen, or Hanfen, (Zacharias Joannides,) another maker of spectacles at the same place, the real inventor of the telescope in the year 1592; and there seems to remain little doubt but that Janfen was entitled to the honour. The account is, that after having arranged the glasses in a tube, this ingenious mechanic hastened to present it to prince Maurice, under a perfuncktion that it would benefit him in his wars; but the secret soon became public, and Lipperheim immediately copied the invention. This first telescope magnified about fifteen or sixteen times, and its inventor viewed with it the spots of the moon, the body of Jupiter, and even saw some small stars above and below his disc, which appeared to move round him, and which therefore must have been his satellites. From this source, it is supposed that Metius gained his information, as well as Cornelius Drebbel, of Alcyon in Holland, who afterwards made similar instruments. We may also mention Francis Fontana, an Italian, as one who claimed the honour of this invention in the year 1608; but from what we have already said, of Janfen particularly, he cannot be considered as the first inventor, though it is possible that the report of such an invention having taken place might incite him to devise the means of effecting a similar contrivance. This, it is generally understood, was the case with the famous Galileo, who, when professor of mathematics at Padua, heard it reported at Venice, in the year 1609, that a Dutchman had pretended to count Maurice of Nassau with an optical instrument, which had the property of making distant objects appear as though they were near; but notwithstanding about twenty years had elapsed since the invention, the means used for producing the wonderful fact were not known; and Galileo, on his return to Padua, in a very few days not only contrived but constructed a telescope, which he presented to the doge Leonardo Donati, and to the senate of Venice, together with an account of the construction and uses which the instrument might be applied to, both for sea and land; for which service it is well known that his stipend as professor was thenceforth tripled. Among other discoveries that were made with Galileo's telescope in the heavenly regions, the four satellites of Jupiter were found by him to revolve round this planet in their respective periods, and were called the Medicean stars, in honour of the house of Medici. This discovery took place early in the year 1610, and Galileo, pursuing his favourite study till March, published at Venice his "Nuncius Sidereus," containing an account of all his discoveries, and dedicated it to Cosmo, the grand duche of Tuscany, who, in a letter written by himself, invited the astronomer to quit Padua for an increased stipend, without the labour of a lectureship. The first telescope which Galileo constructed had only a power of three times; his second was five times more powerful; and his third magnified thirty-three times, which, at so early a date, was no contemptible instrument.

Hence Galileo, though evidently not the first maker of a telescope, has been considered as entitled to all the merit that is due to such a noble invention, seeing he had no model before him, nor instructions how to proceed in the accomplishment of his ingenious work. But though Galileo was successful in the construction and uses of his telescope, which was of the refracting sort, with a concave eye-glass, as we shall presently, yet it remained for that sagacious mathematician Kepler to explain, on philosophical principles, the rationale of that construction. It was he who first explained the nature and effects of both the converging and diverging rays of light, after passing through the respective lenses, and who demonstrated the principles by which new arrangements might be made in the glasses, that would produce a superior instrument. He showed that in small obliquities of incidence, the angle of incidence exceeds the angle of refraction about three times.
He also first proved, that in a plano-convex lens, parallel rays are made to converge to a point which is distant from the lens just the diameter of the sphere of convexity; and that, if both sides of the lens are equally convex, this point will be at the centre of the circle of convexity. It remained however for Cavalieri to discover and to prove, in cases where the radii of curvature of the two sides of a double-convex lens are unequal, that as the sum of both the diameters is to one of them, so is the other to the distance of the focus: and it may be proper to notice here, that the same rules are applicable to concave lenses, except that the focus is at the contrary side of the glass.

It is remarkable, however, that Descartes, the pupil of Kepler, makes no mention of his tutor's improvements, in the art of constructing a telescope, having been carried into execution for several years after Galileo's was brought into use. It was not till the year 1630, that Scheiner describes, in his "Rosa Ursina," the plan of sublittling a convex instead of a concave eye-glass, as suggested by Kepler, to be used for astronomical purposes, where the inversion of the object is a matter of no importance, but where the increased field of view is of material consequence. The same mechanician soon after adds a second convex glafs to his eye-tube, by means of which the objects become erect, which addition was no improvement to the vision, but rather a detriment; and after him, Rhetia gave an erect position to objects, by using three similar lenses in the eye-tube instead of two, which greatly improved the vision, without other detriment than the loss of a little light: and because Rhetia's telescope was adapted for viewing objects on the earth, as well as in the heavens, it was distinguished by the name of the terrestrial telescope, by way of distinction from Scheiner's astronomical one. In both these telescopes, as well as in Galileo's with a concave eye-glass, the power is estimated from the focus of the object-glass divided by the focus of the eye-glasses, as will be seen hereafter.

The study of dioptrics now became general, and several improvements were offered by different individuals in the construction of the reflecting telescope; but among the real improvers must be placed the very ingenious Huygens, who, being well acquainted with the aberration of the rays of light arising from the spherical figure of the glasses, contrived a better arrangement of the eye-glasses than had before been devised. It was however very soon found, that the power of a telescope of any of the preceding constructions, could not be increased by shortening the focus of the eye-glasses alone, beyond certain limits, without introducing great indistinctness, arising from the spherical aberrations; and that the best mode of gaining power, without diminution of light and distinctness, is an increase of the focal length, without much increase of aperture of the object-glasses; and a little experience showed, that it is necessary to increase this length in the duplicate ratio of the proposed increase of power; i.e. in order to magnify twice as much, the focus of the object-glasses must be made four times as long as that of another telescope that has the same light and distinctness; and for any other power in a similar proportion. The consequence of this discovery was, that different makers began to vie with each other, with respect both to the length of their telescopes, and to the size of the objective glases, among these may be mentioned Eufalicho Divini at Rome; Campani at Bologna; Sir Paul Neile, Mr. Reive, and Mr. Cox, in England; and in France, Borelli and Auzout. The last-mentioned mechanician succeeded in grinding an object-glass of the alonning length of 600 feet; and it is said, that Hartlocke made them even longer than this.

It will here occur to the reader, that tubes of this enormous length, if practicable, could not be manageable by an observer; and hence we find, that these very long object-glasses were fixed on the tops of long poles, or to growing trees, and so contrived as to be capable of adjustment for the axis of vision when turned to different altitudes, agreeably to the required position of the remote eye-glass.

But while the length of the telescope was thus inconveniently increased, and the trouble of making good observations therewith proportionally augmented, it became a question to determine in what proportion the aperture might be enlarged with the increase of focal length of the object-glass. Auzout wrote a paper, and delivered it to the Royal Society in the year 1665, in which he affirmed, that the diameter of the object-glasses ought always to be in a sub-duplicate ratio of its focal length, or nearly so; and accordingly drew up a table of apertures suitable for all focal lengths, from 4 inches to 400 feet: upon which Dr. Hooke very properly remarked, that the same glases may have its aperture advantageously enlarged or diminished, according to the quantity of light proceeding from the object viewed.

While powerful telescopes were thus obliged to be unmanageably long, and obtained the name of aerial telescopes, from the circumstance of their having no tubes to be inclined in, the immortal Newton had his penetrating mind occupied with meditated improvements on the figure and arrangement of lenses, and proceeding, as he always did, on rational principles, discovered, from the elongated and coloured spectrum formed by rays of light passing through a triangular prism, and from experiments calculated to investigate the cause of such an oblong form and coloured appearance, that light is not homogeneous, and that different rays are differently refrangible, when transmitted through the same medium. This grand discovery presented difficulties standing in the way of the improvement of the refracting or dioptric telescope, apparently much greater than those which had previously been discovered, as arising only out of the spherical figure of the glases; and all hope of success in making short telescopes of great power, and yet with sufficient light and distinctness, but without an admixture of coloured rays, was given up.

Yet to a mind like Newton's, it naturally occurred, that what could not be practically effected by refraction, might probably be accomplished by reflection of the rays of light into a focus, where, as there would be no separation of the colorfull rays by a refracting medium, there would be no colour nor elongation of the focal point, arising from any other aberration, than what might be caused by the figure of the reflecting surface; he therefore abandoned his proposed plan of grinding lenses after the figure of some of the conic sections, (for which Sir Christopher Wren contrived a machine,) to avoid the effects of spherical aberration in dioptric telescopes, and turned his mind to the improvement of cataoptric or rather cata-dioptric telescopes, which had been previously propo'd to Descartes by Mersenne, and actually constructed by James Gregory of Aberdeen. The composition for the best metal for reflection, and the mode of grinding and polishing, as proposed and practised by Newton, we have already detailed under our article SPECULUM; but as reflecting telescopes have been constructed differently, we will here introduce a short account of the respective differences, before we resume the remaining narrative of the improvements in dioptric telescopes. The first construction of the reflecting telescope was the Gregorian, and most of the portable reflectors continue to be of this construction at the present day; its large speculum is concave, perforated at the centre, and placed at the interior end of the large tube; and the small reflector is also concave, placed
TELESCOPE.

placed opposite the central hole of the large one, in such an adjustable manner, that the rays, after a second reflection, cross one another, and come to the eye-glass in such a way, that an erect picture of the object, or rather of the image of the object, is formed on the retina of the eye. In this construction, it has been suppos’d that the figure of the large concave spectulum ought to be truly parabolic, because this is the figure recommended by Newton for his construction; but this conclusion is erroneous; for it is the joint effect of both the specula that must be ad­verted to in their respective figures, so that the rays may come without aberration to the eye-glass after both reflections; and in order to produce this joint effect, the curve of the large spectulum must be some­what more than parabolic, viz. approaching to hyperbolic, because the small spectulum is also concave, and has its sepa­rate aberration.

In the Newtonian construction, the large spectulum is, or ought to be, truly parabolic, and the small one plane, let diagonally at an angle of 45°; so that the rays, after the second reflection, come to the eye-tube on the side of the large tube, and near its aperture: the rays do not cross here, but come to a focus at the eye-glass, where the object is represented inverted and well defined, as well as bright; for when the rays fall obliquely on the small reflector, they are almost all reflected without diffusion, which is an ad­vantage that this construction has over the Gregorian.

When the Newtonian telescope was proposed to Huygens, he had the candour to acknowledge, which proved to be the fact, that there would not be that limit to the aperture of a reflector, that is preferred by natural neccesity to that of a refractor, and that the power as well as light may be made far to exceed those of the latter.

The next construction of a reflecting telescope was that of Cassgrain, described in the Philosophical Transactions of the year 1672. This differs from the Gregorian only in this particular, that the small spectulum is convex, and the focus of the large or concave one may be longer than is required in the other, for the same length of tube; the rays do not cross after the second reflection, and consequently the object is seen inverted, as in the Newtonian: but here the curve of the large spectulum is less than parabolic, in order that the joint effect of both the reflections may be an ex­emption from aberration. This adjustment of the figures of the metallic surfaces is best understood and accomplished by the fist-rate opticians, and is but little known to mere theorists.

Of the Herschelian telescope we shall only say, in this place, that it differs from the Newtonian in no other respect, except in its size and powers, and that the second reflector is dispensed with, the length of the tube being equal to the focal distance of the large speculum, and the head of the ob­server being con­sequently placed at the upper end or aper­ture of the tube; so that, in this construction, as little light as possible is lost from the single reflection, the principal loss being that which is intercepted, on its entrance into the tube, by the head of the observer. The parabolic curve for the face of the speculum is equally proper for the Herschelian as for the Newtonian telescope.

From these short historical notices it will be seen, that Merlenne first suggested the hint for constructing a reflecting telescope, which must have been before the year 1651, when his Catoptrics were printed; or, according to Descartes’s third and twenty-ninth letters, written in 1639, though not published till 1666, before these letters were written. Gregory, who might or might not have seen Merlenne’s sug­gestion, published an account of his construction in his "Optica Promota," in the year 1663; but as he was not a skilful mechanic himself, it is understood that his telescope was but an indifferent one, and that the theory of his con­struction was not completely realized to his wish. At this juncture, Sir Isaac Newton, who was a good mechanic, as well as mathematician and experimental philosopher, took the subject into his consideration, and, by his successful labours, prevented the invention from falling into oblivion.

His proceedings met with interruption from the occurrence of the plague; but about the end of the year 1668, he be­gan his experiments on speculum metal, and, in the year 1672, produced two small reflecting telescopes. In these, the large specula were ground into a spherical concave sur­face, as being the safest to execute; but he was aware that the parabolic curve, recommended by Gregory, would be preferable, when it could be accomplished by mechanical contrivances, which he judged to be within the reach of human ingenuity. The result of these labours was communi­cated to the Royal Society of London; and, through the medium of their secretary, Mr. Oldenburg, to the inge­nious Huygens, who testified his approval of this con­struction in an account which was published in the Journal des Scavans for the year 1672; and in this way, nearly the whole of Europe became acquainted with the Newtonian con­struction. In the mean time, Cassgrain, a Frenchman, who had varied Gregory’s construction, by subdi­viding a convex instead of a concave small speculum, as we have already stated, in the same journal (des Scavans, 1672), contested the honour of having been the first improver of the original Gregorian telescope; which claim drew from Newton seve­ral objections to Cassgrain’s construction, that will indeed apply equally to the Gregorian. We have, however, re­cently witnessed in captain Kater an advocate for Cass­grain’s telescope, in preference to that of Gregory, (see Phil. Trans. of London, 1813 and 1814,) principally with re­spect to the brightness and distinctness of objects re­spectively seen by them; and his conclusion is, that much of the light is dissipated by the crossing of the rays in the focal point, which is a doctrine waiting for confirmation. In Cass­grain’s telescope, the picture of the object itself is viewed by the eye; but in Gregory’s, the picture of the image representing the object at the point of crossing is only viewed; which circumstance constitutes the essential differ­ence in the two constructions; and it is very probable that the light proceeding from the image of an object may not be so vivid as that proceeding from the object itself, of which the image may be considered as a less enlightened representation.

It is remarkable that no improvement was made on New­ton’s small telescopes till about the year 1723, when Hadley, presented to the Royal Society a reflecting telescope of Newton’s construction, in which the focus of the speculum was 10 feet 54 inches. Though Newton’s were only five inches long each, they were compared to the six-feet refractors, such as were made at that time, but what must have been the public feeling, when Hadley produced his enlarged instrument! This was found at least equal in power to the famous Huygenian refractor of 123 feet at least, its power and distinctness were equal, though the light was not quite so bright.

Since Hadley’s time, the reflecting telescope has ex­perienced considerable improvements from the labours of Mr. Short, Mr. Mudge, the Rev. John Edwards, Dr. Herschel (now sir William Herschel), and others who are our own contemporaries.

But while reflecting telescopes were undergoing their various improvements, and were superceding the use of the long refractors, the idea of correcting both the spherical and prismatic
prismatic aberrations was not abandoned. We have already alluded, under our article Circle, that Cheffer More Hall, &q. of More Hall in Eeftry, so long ago as in the year 1729, constructed telescopes of different glasses; some of which have been preserved, and found, on examination, to be of the achromatic kind, though not known by this designation. But as we are not in possession of any record respecting the invention and mode of constructing such telescopes, we do not presume to say that this was the archetypal of the modern achromatic instrument; and, therefore, we do not consider it as detracting from the merit of the philofopical optic, who afterwards deduced the principles of the invention from accurate and ingenious experiments, and made known his successful application of them at a time when his claim to originality might have been disputed, if the prior invention had been un divulged. It was not till about the year 1767 that Euler, not knowing what had been done by Halley, and profiting by the hint that had been suggested by Sir Isaac Newton, conceived the plan of constructing an object-glass of two such materials, of different refractive powers, as might counteract, by repeated refractions, the diffusion of the differently refrangible rays, and thus bring all the rays into one focal point, so as to admit of a highly magnifying eye-piece. Accordingly two object-glasses were fabricated in a box, as to include clear water between them, to be used instead of a single lens; and though the experiment failed of success, the memoir, written by Euler on this occasion, attracted the attention of the late Mr. J. Dollond, mathematical-instrument maker of London, who, soon after, got about making experiments, as Newton had done, to ascertain if the refractive and difpersive powers of various transparent substances are in a conflant ratio, with the view of compounding, which he at length effected, an object-glass that would bring the rays of light transmitted through it to a focal point, without the prismatic aberration.

In the memoir which Euler had written, and which was published in the Berlin Memoirs of 1747, he affirmed that the indices of refraction might be expressed by the powers of a certain involution, and that the exponents of these powers are proportional for the different rays of light passing through different media. This principle led to the hands of the ingenious Dollond, exciting his attention; and in the year 1753 he addressed a letter to James Short, "concerning a mistake in M. Euler's theorem for correcting the aberrations in the object-glasses of refracting telescopes," which letter was published in the Philosophical Transactions of the same year; the object of which was to prove that Euler had assumed an hypothesis, as the bafis of his calculations, which was contrary to both reason and experiment, or, as Short observes in his accompanying letter, "contrary to the established principles of optics." To this Euler replied, and maintained that his optical principle was a true law of nature; but the practical tell of its truth was wanting, the use that it was intended to be put to.

In 1754, the Swedish geometer Klingensfiera took up the subjed, which now attracted the attention of various mathematicians, and attempted to prove that the Newtionian principle, opposed to Euler's, is in some extreme cases irreconcileable with natural phenomena, and therefore ought not to be received as a law of nature. Dollond, therefore, thus opposed, had recourse to actual experiment, agreeably to Newton's plan of philosophizing; and, rejecting the proposal of putting water between two menisci, with a view of correcting the prismatic aberration by a number of refractions, proceeded to institute a regular series of experiments, in order to determine what could be done by the opposite refractions of different diaphanous media; and as these experiments were the foundation of all the improvements that have followed in the construction of colourles, or what Dr. Bevis denominated achromatic, object-glasses of a refracting telescope, we shall here introduce a summary account of them.

In the first place, Dollond contrived to form a hollow inverted pyramid with two opposite sides of glasses, as in fig. 1, Plate XXIV. Achromatical Instruments, and placed in an inverted position, with a triangular and equilateral prism of glasses, so refracted as represented in the figure. The vessel was then filled with clear water, and a ray of light made to pass through both the water and glass prism: the angle at the junction of the glass plates, closing the vessel, was capable of enlargement or diminution; and the glasses fides were made to recede or approach, until an object seen through the water and glass prism was in its true place, i.e. until the refraction of the water balanced the opposite refraction of the glasses. The result of this experiment proved contrary to what had been expected from Newton's experiments, viz., an external object seen through this compound prism was fringed with colours. But to be quite sure that there was no dejection in the appearance, a glass prism, formed to an acute angle of only 9 degrees, was substituted, which was also more convenient for the experiment, and the vessel was closed, as in fig. 2, until the opposite refractions balanced each other as before; but still the object viewed through the compound prism was tinged with the prismatic colours. The mean rays in these trials proceeded in a straight line, after quitting the second wedge of water; but the extreme rays were deflected, or turned respectively out from exact parallelism. After having thus ascertained that equal and opposite refractions of glasses and water will not destroy the colours, the author varied the experiment, by altering the wedges of water, till he found that the refraction occasioned by the water must be to that occasioned by the glass as 5: 4, before the colours will disappear. The next step was to pursue the proportions thus ascertained, in the construction of an object-glass containing water; but, after uting a deep and double convex lens of pure water, with a concave one of a glass, the object seen through the telescope with this compound object-glass was indeed free from colour, but by no means so distinct as was desired, and consequently the spherical aberration yet remained. This telescope was made in 1757, and served to prove that the separation of the extreme rays, or what has since been called the difperfion power, in the case of an union of glasses with water, is not proportional to the mean refraction; as Sir Isaac Newton had allowed it to be, in the same experiment (see Newton's Optics, p. 112, 3d edit.); consequently the idea must now have occurred of trying other diaphanous substances with different refractive powers, to see what the disperfion would be in them. After an interval of some time, during which different kinds of glasses were procured, the ingenious and persevering artift found, for the first time in the year 1757, that the difperfion power of the cryfyal or white flint-glasses was greater than that of the English crown-glasses, and also that the power of the latter was very similar to that of the Venice straw-coloured glasses. He determined, therefore, to try a wedge of flint-glasses, and another of crown-glasses, formed to different angles, as in fig. 3, until, when reversed, their opposite refractions were equal; which equality took place, when their angles were respectively 25 degrees and 29 degrees; in which case, the lines of half the angles, or the indices of their refractions, were 216: 250, or nearly as 19: 22. But though the direction of the pencil of light was
TELESCOPE.

was now unchanged, as was expected, the compound rays had not all the same divergence. The shape of the wedges was then modified, so that the colours disapparred by a due opposition of their respective dispersions; and when this was effected, the refractive powers of the two wedges were found nearly 2 : 3; and, consequently, the sines of half their angles, 19 : 33; which ratio is nearly 4 : 7. In this situation of the wedges, the rays which enter parallel emerge also parallel, while they are equally deflected from the points of emergence. The results may be obtained very strikingly by an union of four wedges, or pair of compound wedges, as represented in fig. 4, where the crown receives the rays first, and where the rays, at equal distances from the central line of union, meet at the same point. This, therefore, pointed out the construction of a double object-glares, such as is represented in fig. 5, in which the convex curve of the crown-glares is to the concave curve of the fluid, of given qualities nearly as 7 : 4, or nearly in the ratio of their respective dispersive powers. But to avoid the too great effect of spherical aberration, arising from the quick curves, the single convex lens of crown-glares was made into a double convex, with double the radius of convexity; and also the single concave might be made double, with a similar increase in its radius of convexity, to answer the same purpose as the combination last described. But, in this case, the convexity of one glaress would not fit the concavity of the other, so as to come nearly in contact throughout; it appeared necessary, therefore, that while the internal faces fitted each other, the external concavity of the flint-glares should be eight times less, or of longer radius than before proposed, in order to maintain the balance of opposite dispersions; or otherwise, as in fig. 6, if the double concave faces of flint-glares remain as above stated, the front convexity of the crown-glares must be five-sevenths of the due curvature, as proposed above, while the inner surface remains in perfect contact with the concavity of the other. In these combinations, the superior refraction of the convex lens, being diminished one-third part by the opposing refractive power of the concave lens, required this convex to be ground and polished to a focus three times shorter than would be required for the same lens used singly; and the option, that is afforded the artist, of varying the curves at pleasure, provided the combined effect of the compound lens shall produce a proper effect in blemishing the colours, admits of a modification that will correct the spherical aberration also, in a great measure. Telescopes on this achromatic principle were first contrived in the year 1788, and when their merit was once acknowledged, the great number that the inventor and his succeffors have had occasion to make, both for sale among their customers, and for exportation, have afforded them the easy means of trying a variety of concave and convex glasses together in focussing, before they were finally paired; so that their succeffors not only originated in, but has been continued by, the aid of experiments, which no one but the Dollonds has had the power of executing to so great an extent. See DOLLOND.

Nor was J. Dollond's success confined to the manipulation of object-glares alone; he had previously contrived and contructed the improved system of eye-glares, in which object he was followed by his son-in-law, Ramilson.

This improvement consisted in extending the usual number of eye-glares to five, so symmetrically arranged, that by dividing the errors of spherical aberration, they reduced their amount to an inconsiderable quantity.

The value of this arrangement will be best understood from his own words, which we will extract from his letter, published in the Philosophical Transactions of the year 1753. "If any one," says he, "would have the visual angle of a telescope to contain 20 degrees, the extreme pencils of the field must be bent or refracted in an angle of 10 degrees; which, if it be performed by one eye-glares, will cause an aberration from the figure in proportion to the cube of that angle; but if two glares are so proportioned and situated, as that the refraction may be equally divided between them, they will each of them produce a refraction equal to half the required angle; and, therefore, the aberration being in proportion to the cube of half the angle taken twice over, will be but a fourth part of that, which is in proportion to the cube of the whole angle; because twice the cube of one, is but one-fourth the cube of two, so the aberration from the figure, where two eye-glares are rightly proportioned, is but a fourth of what must unavoidably be, where the whole is performed by a single eye-glares. By the same way of reasoning, when the refraction is divided between three glares, the aberration will be found to be but the ninth part of what would be produced from a single glaress; because three times the cube of one, is but one-ninth the cube of three. Wherefore it appears, that by increasing the number of eye-glares, the indistinctness which is observed near the borders of the field of a telescope, may be very much diminished, though not entirely taken away."  

We have given this quotation at full length to shew, that in his adoption of several glaresses in an eye-piece, the ingenious mechanic was not entirely indebted to his experiments, unassisted by reasoning and mathematical inferences, and accordingly the Royal Society rewarded his skilful labours with Copley's medal. John Dollond was succeeded in his business by his nephew, by his sons ingenious and industrious son, Peter Dollond, who improved the achronic object-glares still further, by placing a double concave flint-glares between two convex ones of crown-glares, as in fig. 7, and by enlarging the aperture to 3/4 inches in a 45-inch telescope; of thefe, a great number has been manufactured, and several of five feet focal length. His calculations of the radii of convexity and of concavity were never publicly made known; and perhaps constituted a secret, on which the continuance of his celebrity depended, when the time of his father's patent had expired. The business is now successfully conducted by G. Dollond, the nephew, to whom we are indebted for much liberal information; but at no period liad any of the Dollonds an agent in Paris, as is said in the new Supplement to the Ency. Britannica. For several years from the time of the eldest Dollond's death, the foreign Transactions were crowded with diffirrections and memoirs on the combinations of achronic lenses mathematically determined, and the subject afforded ample scope for the geometrical and analytical reseafch of an Euler, a Clairaut, and a D'Alembert, as well as for Boscovich, Klingenberg, Kafter, and Henert: but in this, as in some other speculative investigations, the labours of the profound mathematician have not much benefited the practical advancement of the art to which these labours have been directed; nay, they have tended to keep at a distance from each other the mathematician and the mechanic. Boscovich's eye-piece, however, may be considered as constituting an exception to the preceding remark, and deserves here to be particularly noticed. According to one of his theorems, an eye-piece free from colours may be composed of two similar lenses of the same glass, provided they be placed from each other just one-half of the sum of their focal distances; which is very similar to the eye-glares now commonly adopted, in preference to a single lens, in the common astronomical refracting telescope, the only difference
ference being, that in Boscovich's the lenses are of equal convexity; whereas, in the common improved astronomical eye-piece, the inner lens has a longer focus than the outer one, in the ratio of 3 : 1, and being both plano-convex, they both have their curved faces turned towards the object-glas.

From the preceding experiments of the Dollonds, have resulted all the advantages that the achromatic refracting telescopes possess over the long telescopes with simple object-glafs, and which have put them in competition with the best reflectors in the essential qualities of power, light, and diffuseness of vision. There is, however, an imperfection, notwithstanding Dollond's great skill and perseverance, which remains yet to be overcome, if it is not invincible, which is, that while the colours occasioned by the extreme rays are corrected with sufficient accuracy by the compound object-glafs, yet the intermediate rays are not perfectly corrected; and if any media can be so modified as to correct all the rays that fall on every point of the surface of the object-glafs, so as to make them unite at the same point on the line of the axis, then, and not till then, will the object-glafs be quite perfect. For, even if the son of John Dollond, who, we have said, succeeded to his father's business, pursued this subject after his father's death; and in the year 1755, communicated to the Royal Society by letter the result of his experiments. He remarks, that when his father had made object-glases of one convex lens of crown-glafs, and of one concave of flint-glafs, to be used with convex eye-glases, it was found that the excess of aberration was in the convex portion of the compound object-glafs, and that the equality of the counteracting aberrations could not be carried to any great distance from the centre of the glafs; he therefore attempted, about the year 1758, to make short object-glafs of the same sort, to be used with convex eye-glases; but it was found, that, as the field of view, in using a concave eye-glases, depended on the aperture of the object-glafs, the limits of the aperture were too confined with a double object-glafs. This trial led the senior Dollond to a conclusion, which the son took up, and profited by; namely, that the excess of spherical aberration, occasioned by one double convex lens of crown-glafs, might be diminished by substituting two plano-convex lenses of similar glafs and curves, placed one at each side of the double concave of flint-glafs. The senior Dollond had succeeded with this construction when a concave eye-glases was used, and when the compound focus was short; but it remained for the son to complete a long object-glafs of this construction, to be used with convex eye-glases; which he succeeded in doing, first with a telescope of 5-feet focus, and 12 inches aperture, and afterwards with a 33-feet one of the same aperture, which he invited the Royal Society to see, and which was the prototype of the numerous achromatic telescopes of the same dimensions, which have since been constructed and dispersed by sale through all the regions of the globe.

Among the first achromatic telescopes made by P. Dollond, was one purchased by the duc de Chaulnes, who examined very minutely the radii of the respective glafs, and published an account of them in French measures, which, converted into English inches, will stand thus; 32.4 and 40.8 for the outer convex of crown-glafs; 22.2 and 30.6 for the double convex of flint; and 30.6 with 35.5 for the inner convex of crown-glafs; but as the qualities of the respective glafs are not specified, no useful inference can be drawn for the construction of another telescope, in which the glafs of each lens may be of another quality. This telescope, we learn from the present Mr. G. Dollond, had a focal length of 46 inches; and the five-feet telescopes subsequently made, have each an aperture of four inches; but the largest and best telescope of the achromatic kind ever made by P. Dollond, is that of ten-feet focus, and five inches aperture, lately converted into a superfine transit instrument by Mr. Troughton, and placed in Greenwich Observatory. See TRANSIT Instrument.

Soon after Peter Dollond's telescopes began to be in repute, namely, in the year 1759, Benjamin Martin, at the same time a mathematician and a mechanic, who had long turned his attention to the construction of telescopes, and described various constructions, published his "New Elements of Optics," a book now, like Edwards's Treatise, extremely scarce, in which he has entered more minutely into the doctrine of both kinds of aberrations, as they relate to practice, than any other author has done, either before or since. He not only followed the steps of J. Dollond in determining by glafs wedges or prisms the relative refractive and dispersive powers of different specimens of glafs, but ground single object-glafs of several kinds of glafs, with tools of the shape radius, and then compared the geometrical foci of each with the refracted or real foci, by nice measurements: by this means he ascertained the difference between the focus determined theoretically from the known radius, and the real or practical focus of the refracted rays in each glafs by measurement, confidering at the same time the distance of the radiant point; and thus he gained, as we shall have occasion to shew more particularly hereafter, the ratio between the sine of the angle of incidence and of the angle of refraction in each particular specimen, which ratio, in a ray passing from air into glafs, had been assumed in all former optical theorems as $\frac{R}{a} = F$ with parallel rays became the basis of the rectified theorems, which we propose to give presently in their proper place. According to these new elements, and from a measurement of the angles of dispersion, or of the coloured spectre contained between the extreme rays, as given by a prism of flint, and another of crown-glafs respectively, the ratio of which he determined to be as 5 : 3, he calculated that "the radii of the lenses must have the same proportion as the distances of the lines of incidence and refraction in red and violet rays, in prisms of equal refraction angles of white and crown glafs;" and that, therefore, "the radii [or foci] of the lenses must have the same proportion as the angles of dispersion in refractions by such prisms; and, of course, the same proportion as the lengths of the coloured spectre produced thereby." From these considerations the author concludes, that "in all cases of a compound lens for producing vision without colours, the ratio of the radii, $r$ and $R$, of the concave and convex lenses (when two only are used) must be that of 5 : 3; and that then the ratio of their focal distances for parallel rays will be that of 3 : 2 nearly. The ratio of the foci of two lenses being thus determined that shall make the colours vanish, the longitudinal aberration arising from the respective curves was next considered; and in doing this, care was taken that the comparative foci of the two lenses was not to be altered by an alteration in the curves now to be rectified. By Huygen's
gene's general theorem, the aberration arising from the curves of any lens may be determined and compared; and it being known from this theorem, that the longitudinal aberration is equal to 5 of the thickness of a double convex lens of equal radii, a double concave was determined from an equation of this aberration such that its contrary aberration might counteract the aberration of the assumed convex lens of equal radii; and the numbers thus produced for the radii of the double convex of crown-glass, and of the double concave of flint respectively, were 3.36, 8.36, 10, and 23 inches, in which the focal distances of the two lenses are said to be nearly as 3 : 3. In this combination, the compound focus is stated to be 23.3 inches, and the radius \( r = 23 \) is contiguous to the convex glass. Other calculations were also made where the radii of the convex lens were unequal, as well as those of the concave, but we do not learn that a good achronic object-glass, put together agreeably to Martin's calculations, was ever yet constructed. In the instance before us, it is evident that the curve 8.36, coming in contact with the concave 23, must touch it in the middle, and therefore the proportions are impracticable.

While these various improvements in the construction of a telescope were going on, we must not omit to mention that different kinds of micrometers were applied to it successively, by different ingenious men, for the purpose of measuring small angles; by which addition, the science of astronomy has been greatly promoted. Among those promoters of this noble science, may be enumerated: Auzout, Gafoigne, Hooke, Le Fèvre, Kirchues, Calfin, Fouchy, Hollman, B. Martin, Savery, J. Dollond, Dr. Malkeyne, Ramdzen, Dr. Herschel, Smeaton, Rochon, Reitner, Cavallo, Troughton, and Arago, the present astronomer royal of France.

But it remained for the ingenious optician of Iffington, C. Tully, to whom we are indebted for much valuable information on the subject of our present inquiries, to calculate and manufacture, from any two given speciments of crown and flint glasses, a double object-glass that shall, generally speaking, be found both achronic, and also as free from the effects of spherical aberration as art can make it.

After this artist had made himself master of Martin's proposed plan of compounding an achronic object-glass, he found that the curves calculated for this purpose would not produce their desired effect with any specimens of glasses that could be procured; but still he thought that a careful repetition of Martin's experiments might lead to refusals favourable to his views, when some modification was made in their application. He, therefore, in the year 1805, obtained six sorts of glasses, differing in specific gravity, and ground them all to the same radius by a tool of speckled metal, that did not much alter its figure by attrition in grinding, and in giving a partial polish: these lenses were fitted successively to one cell, that was received by a tube having an eye-piece at the opposite end, in order that the focal focus of the refracted rays might be the more accurately measured with each glass used as an object-glass of a telescope; and though the polish was imperfect in these lenses, ground and partially polished by the same tool, yet the image of the sun was clearly defined by them. These focal distances, limited by the focal image, were in the next place measured carefully by a nicely divided scale, and were found to differ from one another considerably, as we shall hereafter have occasion to state more particularly: the radius of curvature of the tool was also ascertained with equal care, and found to exceed in length the long of the focal lengths of the refracted rays. The radius of the tool was then divided by each of the refracted focal lengths, and the quotients were called so many divisors or multipliers, accordingly as the geometrical was to be determined from the refracted focus, or the contrary. These quotients, therefore, bore the same proportion to unity, that the geometrical focus bore to the refracted focus of each lens, and turned out to be very nearly the same quantities that Martin had determined with glasses of similar qualities, and that he denoted by the expression \( 2a \) in his modified theorems. In fact, they were the numbers from which the ratio of the lines of the angles of incidence to the lines of the angles of refraction were accurately determined, as will be explained hereafter. The specific gravities of the different lenses were then taken with a good hydrostatic balance, and were found to increase with their corresponding divisors, but not in a regular proportion. From these experiments a set of tables was constructed, containing, in parallel columns, both for crown and flint glasses, the specific gravities, varying from 3.466 to 2.428, together with the corresponding ratios of the lines of the angles of incidence and of refraction; and also the ratios of the two curves, that shall produce an assigned longitudinal spherical aberration in any lens; all which calculations are extended from the ratios 1 : 1, 1 : 1.01, 1 : 1.02, &c. in succession, up to 1 : 6, where the aberration is a minimum, as it was long ago determined by Huygens: and what is worthy of remark, the French plate-glasses, which had the specific gravity lowest, and its divisor only 1.004, and which, consequently, had its refracted focus nearly equal to its geometrical focus, was, in all probability, similar to the glasses manufactured at the time when the experiments of Sir Isaac Newton were made, from which the original optical theories were framed. From these tables, our skilful optician takes his curves by inspection suitable for glasses of any given specific gravity, such as will suit his tools for telescopes of different lengths; and having as it were the command of the whole range of varying ratios, he can immediately fix on suitable curves for any glasses, and for any compound focal length, or even assign a fellow that shall match any practicable lens, convex or concave, that has been previously polished. Such is the facility which this ingenious and persevering optician has attained in the highest branch of his art, whilst, at the same time, his skill in grinding, polishing, and centering his glasses, is not exceeded by any other artist. The principal deviation from Martin's rules, that Tully found it necessary to adopt in his practice, is the application of a correcting number to the calculated or tabulated aberration arising from the figure of the flint-glasses, on account of its difference of refractive power, as compared with that of the crown-glass: in order to gain which correcting number in all different cases, he first reduces the geometrical foci of the two separate lenses into the refracted foci by his divisor = Martin's \( 2a \), and extracts the square root of the cubes of those refracted foci respectively; then dividing the root of the flint-glass by the root of the crown-glass, he gains the correcting divisor, by which the calculated aberration of the flint-glasses is divided, to produce the corrected aberration for the concave lens; which lens must now have its radii determined agreeably to this corrected aberration from the general theorem, or may be taken from the tables to be substituted for the radii that would have been requisite, if the proportional aberration had remained uncorrected. And lastly, that the foci of the separate lenses may be so proportioned to each other, and to the compound focus of both the lenses, which is usually given when a telescope is to be made, the ratio between the focus of the crown-glasses and of the compound glasses, having been calculated by an appropriate theorem, as will be explained, is tabulated to suit different sorts of glasses agreeably to their specific gravities; so that Martin's constant ratio of 3.3 is varied according to the variation of the specific
cific gravity, which is assumed as bearing a due proportion to the dispersive power. Thus, when a piece of crown and a piece of flint glasses are produced for an achromatic object-glasses, the specific gravity is first taken, and then the tabulated numbers, corresponding to these gravities, are taken from the columns of the tables, and the work is put in hand as soon as suitable tools are selected for producing the curves: or rather, when the relative facts are determined, the curves are fixed on in the tables that will suit the aberrations in question, and that can also be produced by such tools as are in use; for the formation of a new grinding tool is a serious undertaking, that the optician will wish to avoid. But after all, the chief practical difficulty remains; the fame curves cannot always be worked to be exactly similar, even in the same glasses, with the same tools, and by the best workmen: which circumstance leaves the nice calculator, in some measure, under the control of his materials, and renders final adjustments indispensable. These observations are corroborated both by the candid acknowledgment of Tulley, and by the subjoined extracts, which we beg leave to transcribe from the letters of our estimable correspondent Mr. G. Dooland.

"The perfection of our object-glasses," says Mr. Dooland, "is in a great degree promoted by the great pains we take in selecting these glasses that suit each other the best; and also in adjusting them very carefully: yet that is not every thing that is necessary to produce good object-glasses; they must be correctly worked, and the glasses be of perfect and proper quality.

"With respect to the surfaces used in our various object-glasses, it would be almost endless to enumerate them, as they depend upon, and vary with almost every piece of glass that is used in their formation; and there are some nice points in the method of working them, which I should not wish at present to disclose. Our usual mode of proceeding is, in the first place, to calculate the proportions that are requisite for the kinds of glasses that are to be used, and then to select from our great number of tools those that come the nearest to the surfaces determined upon; and it frequently happens that we have not any that will answer, particularly for the spherical aberration. We do not enter into those very nice calculations that would be satisfactory to a theorist; we only aim at something near to what is required; for to practical men, it is always more easy to produce what they wish by practical methods. Mr. Short, the celebrated maker of reflecting telescopes, used to proceed by first making his large metal as nearly correct or parabolical as he could, and then, from a number of small metals, to select, by trial, that which corrected the large one in the best manner.

"In all matters relating to the practice of optics there is much uncertainty, and it frequently happens that, with the very best endeavours, we cannot produce by the fame means the same effect, where extreme correctness is required; so that you may very readily conceive, that very exact calculations, however requisite, will not always answer. In a rough way of taking the focal lengths and surfaces of an achromatic object-glasses, composed of crown and flint glasses of the usual densities, we should lay crown 1:3 and flint 2:3; the outer surface of the crown shorter than that which is next to the flint, and the shortert radius of the flint next to the crown; and the nearer it can be brought without touching in the middle, the more perfect will be the performance; though this will in a great degree depend on the aberrating powers of the glasses used; for sometimes we find it necessary to make the crown nearly of equal radii. The French opticians make the radii of the convex lens very unequal, and place the shortert radius next to the flint; and instead of crown they use Bohemian plate, which is nearly of the same refracting power, but of a different colour, their flint-glasses being of a much less specific gravity than the English.

"The great barrier to further improvement, particularly in the extension of the aperture, is the want of good glasses, which circumstance has ever been lamented; and from the exceedingly increased duties, which act against the improvement of every manufacture, a prohibition is now likely to take place altogether."

In this historical account of the invention and successive improvements of the telescope, we have said nothing about the ingenious experiments of Dr. R. Blair, professor of astronomy in the university of Edinburgh, which were made, with a view to ascertain the dispersive powers of different liquids, about the year 1787; and for this reason, that we consider any telescope of which a liquid forms a constituent part, to be a temporary rather than a permanent instrument. Neither have we given Dr. Herchel's labours so prominent a place in our narrative as they deserve, because we shall have occasion to describe his reflecting telescope, with reference to its appropriate plate, in a subsequent section of our article.

Besides the preceding improvers of the telescope, several persons, chiefly amateurs, have taken out patents, either for alterations in the appendages of this instrument, or for peculiar modes of using them for particular purposes, with a short notice of which we shall conclude this section of our article. On the 4th of April, 1791, Mr. Robert Blair, a surgeon in the navy, took out a patent for securing to himself the advantages to be derived from using a fluid medium, in conjunction with glasses, to correct the prismatic aberration in an object-glasses of a reflecting telescope, agreeably to the experiments previously made on this subject by Dr. Robert Blair, as we have just stated. On the 26th of January, in the year 1799, Mr. Caton Rand, of Lewes in Sussex, took out a patent for an improved military and naval telescope, for ascertaining distances, and the size and extension of objects, by means of a new micrometrical adjustment. This micrometrical telescope, however, was nothing more than the parallel wire micrometer, applied to a common pocket achromatic telescope, in which a vernier scale projected from the eyepiece, and indicated the quantity of the measured angle to the professed accuracy of 6", but how the instrument was kept ready enough without a stand for the use of such a micrometer, is not explained.

Mr. Dudley Adams, of Fleet-street, optician, took out a patent, on May 30, 1800, for rendering telescopes more portable; the object of which was to secure the advantage to be derived from using tubes, with flits made in such a way as to make them move smoothly, and yet without shake, within one another. Mr. G. H. Brown, secretary to the Weftminster fire-office, in Bedford-street, Covent-Garden, has described, in the 11th volume of the Repertory of Arts and Manufactures, a reflecting telescope, that always lies in a horizontal position; and, receiving the rays of light on an inclined plain mirror, having a central perforation, and placed near the insertion of the eyetube, reflects them to the large concave speculum, which, by a second reflection, forms the image in the eyetube. Benjamin Martin constructed a reflecting telescope in this way, which he used in a vertical position for terrestrial objects; and the only difference in the two constructions seems to be, that in Martin's, the main tube was reclined when viewing elevated objects, such as the heavenly bodies, whereas Brown's plain mirror has a vertical motion independently of the main tube. They have neither of them come into common use.

Mr. Manton, gun-smith, of Davis-street, Berkley-square, London, took out a patent on the 23d of January, 1810, for
TELESCOPE.

For securing the use of an exhausted tube, on a supposition that there would be more light when the rays were refracted to a focus in vacuo. Mr. Cornelius Varley, artist, now of Newman-street, London, took out a patent for a graphic telescope, for the purpose of delineating drawings from nature, on the principle of Dr. Wollaston's camera lucida, the date of which is April 5, 1811. And on the 21st of May of the same year, Dr. Brewster of Edinburgh, and Mr. Harris, optician, of Holborn, London, jointly took out a patent for a micrometrical, double-image, and coming-up glafs, &c, which has its scale of measurement running longitudinally along the tube. This telescope, being on a new construction, will be particularly described hereafter.

2. Theory of dioptic Telescos.—Before we can properly describe the various constructions of either the refracting or reflecting telescope, it will be necessary to explain the principles on which those constructions are founded; and for the sake of order, we will confine ourselves, in the first place, to the considerations of the elementary principles of dioptries, as far as they are connected with the theory of the refracting telescope. Among the various writers who have considered this subject, in both a scientific and practical manner, Benjamin Martin stands first in our estimation; and as his "New Elements of Optics," published in 1759, are but little known, by reason of the fearlessness of this work, notwithstanding it contains the result of all his theoretical and practical investigations, we shall make no scruple in availing ourselves of his labours, as often as they contribute to the purpose of either illustration or practical application: our aim being, in this article, as in some former ones connected with it, to bring the mathematician and the mechanic into a state of mutual understanding.

We propose, therefore, to avoid as much as possible all abstruse calculations, that have no tendency to produce practical advantages, but to introduce, in as familiar a manner as possible, those mathematical investigations only, which are essentially explanatory. The first and fundamental principle in dioptries is this, that in all uniform media, such as air, water, glafs, &c., the angles of incidence are in a constant ratio to the angles of refraction of any homogeneric ray of light, incident on the surface of such refracting medium; which principle was first discovered by Snell, when Huygens had gone no further than to assert, that in small obliquities of incidence, the angle of refraction was about one-third of the angle of incidence. In the glafs which Isaac Newton used, the ratio of the angle of incidence to the angle of refraction was found to be 30 : 21, or nearly 3 : 2, in passing out of air into glafs; and had all kinds of glafs been found equal with respect to their refractive powers, the radius of convexity would, in all cases, have been equal to the focus of a double convex lens of equal radii; which equality may be considered as the basis of all the geometrical theorems in optics, that take no account of the difference of the refractive powers. But since the difference of the refractive powers of various specimens of glafs has become an object of indisputable examination to the optician of modern times, it has become necessary to introduce into each theorem the ratio between the angle of incidence and angle of refraction, whatever it may be found to be by experiment, before the refracted focus of any individual lens, depending on the quality of the glafs, in some measure, can be determined from the geometrical focus depending on the radius of convexity or concavity. As we have demonstrated, under our article REFRACTION, the constancy of the ratio between the refractive powers and of refraction of a mean refracted ray; and have also explained how the geometrical focus of any lens may be determined with converging, parallel, and diverging rays, under the term LEN; we will proceed to apply the doctrine arising out of these demonstrations and explanations to our present purpose. "Let DC (Plate XXIV. Achromatical Infrums, fig. 1.) be a ray of light incident out of any medium X, upon the surface, H O, of another medium Y, which we will suppose to be more dense than X; and from the point of incidence C, let it be refracted to F, out of its first direction D C M. This refraction may be considered as arising out of the attractive power at the surface of the medium Y, and as acting upon the ray in a perpendicular direction, by which, on mechanical principles, it will acquire some additional force and velocity of motion through the medium Y. Now upon the centre C describe the circle A O P H, cutting the incident ray in D; and drawing the diameter A C perpendicular to H O, let D L fall perpendicular thereto, and it will be the sine of incidence. Let D C or C E represent the space described in a given time in the medium X; and from E draw E F parallel to A B, to denote the acquired force in C; then the motions in the directions C E and E F, in the same time, being compounded, will produce a motion in the direction found by joining C F; for C F will be the space described in the medium Y, in the same time that D C (= C E) was passed over in the medium X, and consequently will be the refracted ray; and G 1, perpendicular to A B, will be the sine of refraction.

"Through F draw N M parallel to H O, and draw K E perpendicular to A B; then will B F = K E = D L be the sine of incidence; and in the similar triangles C B F, H E N, we have C G : C F :: G I : B F. Hence it appears that we have the sines of the angles of incidence and of refraction B F or D L, and G I, as the velocities C F and C D (= C G) in the different media inversely, and on this supposition they are in a constant ratio; because the velocities are invariable, being produced by the uniform operation of nature. And on the contrary, if the ray F C be considered as passing out of a dense medium Y, into a rare medium X, it will be deflected by the superior force of the medium Y, into the direction C D; making D L : I G :: C F : C D, as before.

"Let us now conceive A M D, in fig. 2, to be the curved surface of a refracting medium Y, and B a radiant point in a more rare medium X, from which two rays proceed, and fall upon the curve in the points M and N indefinitely near to each other: these rays will be refracted as to cross each other in a certain point F; to determine which from the given equation of the curve, the distance of the radiant, and the refractions of the media, is that problem in dioptries, on which the various calculations and inferences depend. That we may render the solution of this problem intelligible to our readers, let us make the lines C M and C N the radii of curvature, and consequently perpendicular to the curve at the points M and N; upon M F and N F let fall the perpendiculars C G and C G, cutting F M in S; also upon the incident rays B M, B N, continued, let fall the perpendiculars E C, E C, and on the centres B and F, describe the small arcs R M, M O; and put B M = d, M E = a, M G = b; the arc M R = t, and the arc M O = t; and lastly, the sine of incidence C E to that of refraction C G, as m to n, the radius of curvature being C M = r. Then the triangles M E C, M R N, M G C, M O N, M B R, are similar, as is thus evident: if from the right angles R M E, C M N, you subtract the angle E M N, there remains the angle R M N = E M C; and if from the right angles F M O, C M N, you take the angle F M N, there will remain the angle O M N = G M C. These triangles
angles are, therefore, equiangular, and consequently similar. Hence we derive the following analogies for determining the refracted ray MF; viz. ME : MC :: MR : MN;

that is, \( \frac{a}{r} = \frac{t}{s} = \frac{r}{a} = MN. \)

"Again, from the triangles MGC and MON, we have

\[ \frac{MG}{MC} = \frac{MO}{MN} \]

that is, \( \frac{b}{s} = \frac{a}{t} \); and so \( a : b :: s : t \), or \( \frac{bs}{a} = MO. \)

And in the triangles BMR, BQE, we have \( \frac{BM}{BE} \) :: \( \frac{MR}{QE} \) that is, \( \frac{d + s}{a} :: \frac{i}{r} \). But \( CE = CG \) :: \( CE : CG \); \( m :: n :: CG - CE :: CS \) :: \( CE : CG \); \( \frac{ds + as}{d} :: \frac{nas + nds}{md} = Sg. \)

"Lastly, the similar triangles EMO, FSG, give \( \frac{MO}{Sg} :: \frac{MF}{SF} \); therefore, \( MO - Sg : MF - GF \) (or \( MG :: MF \)); that is, in symbols

\[ \frac{amd - aans - nds}{b} :: \frac{b}{md - aan - nds} = MF, \]

the focal distance required.

"As the right angles at E and G are both subtended by the same hypotenuse, or right line MC, it is evident that this line is the diameter of a semicircle, MEGC, passing through them, as in fig. 3; and if the curve AMD be a circle, then C will be its centre; and when the point M is extremely near to the vertex A, there will be \( ME = MG = MC \), or \( a = b = r \). In this case, the theorem becomes

\[ \frac{md - nd - nr}{md - nd - nr} = AF = f; \]

and the point F, or focus of refracted rays, is then in the axis BC produced."

From this original theorem for finding the simple refraction of a pencil of diverging rays out of a rare into a dense medium, may be derived other theorems for finding the simple refraction out of a dense into a rare medium, and for the refraction of lenses of any of the common shapes, either at the first or second surface. We will subjoin a small table of such of these theorems as apply to glasses of the ordinary construction.

Theorems for one simple Refraction.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Diverging</td>
<td>( \frac{md}{md - nd - nr} = f. )</td>
<td>( \frac{-md}{md - nd + nr} = f. )</td>
</tr>
<tr>
<td>Parallel</td>
<td>( \frac{mr}{m - n} = f. )</td>
<td>( \frac{-mr}{m - n} = f. )</td>
</tr>
<tr>
<td>Converging</td>
<td>( \frac{md}{md - nd + nr} = f. )</td>
<td>( \frac{-md}{md - nd - nr} = f. )</td>
</tr>
</tbody>
</table>

Out of Glases into Air.

| Diverging   | \( \frac{-nd}{md - nd + nr} = f. \) | \( \frac{nd}{md - nd - nr} = f. \) |
| Parallel    | \( \frac{-nr}{m - u} = f. \) | \( \frac{nr}{m - u} = f. \) |
| Converging  | \( \frac{-nd}{md - nd - mr} = f. \) | \( \frac{nd}{md - nd + mr} = f. \) |

Hitherto we have considered the refraction of a ray at only one surface of a lens; but as every lens has two surfaces, or radii, \( r \) and \( R \), it is necessary to carry our investigation farther, and see what theorems can be obtained for finding the foci of glasses of the different shapes, when double refraction takes place, which is the case in all instances of complete transmission. By way of distinction, we will consider \( r \) as the radius of the first surface, or that which receives the rays from the radiant; and \( R \) as the second surface, or that which is supposed to be turned from the radiant, in all our subsequent theorems. We must now consider a ray, as \( MN \), in fig. 4, coming out of a dense medium \( Y \), after proceeding in a direction towards \( F \), into the rare medium \( X \); but meeting with a spherical surface \( ND \), on quitting the dense medium, is refracted into the direction \( NF \), to intersect the axis \( DF \), in the focal point \( F \). When two spherical refracting surfaces are near to each other, as \( AM, ND \), in fig. 5, they constitute a lens \( AMND \), of which the radius of the curve \( AM \) is \( r \), when the radiant is on that side, but that of \( ND \) is denominated \( R \); and the line \( BADF \), passing at right angles through the middle of the lens, is called the axis. Now to find
TELESCOPE.

find the point $f$, or focal distance $D_f$, of the ray BM, coming from the radiant B, after being twice refracted, viz. at M and N, the points of ingress and egress, is the general problem of dioptrics.

In solving this problem, our original theorem for simple refraction gives us $mf - mdr = nrf + ndf$ (making $MF = r$, from which equation we deduce this expression; viz. $\frac{m}{n} = \frac{r + d}{\phi - r} \times \frac{BC}{CF} \times \frac{AF}{AB}$ which gives this universal canon; viz. "the ratio of the foci of incidence to the foci of refraction, is compounded of the ratio of the distances of the conjugate foci B and F from the centre C, and of the ratio of their distances from the vertex A." This rule being general, finds the focus $f$, after the second refraction at N: for let $D_f = f$, the radius $GD = R$, and the thicknesses of the lens $AD = t$; then we have for the refraction out of a dense medium into a more rare one, $\frac{n}{m} = \frac{FG}{FD} \times \frac{\phi + R - t}{t + R} \times \frac{f}{\phi - t}$; from whence we get $f = \frac{m\phi + mR - n\phi + ntR}{nR + mf - mR + nR} = D_f$, the focal distance required. If we omit the thickness of the lens $t$, as being inconsiderable, we may reduce the equation into a more simple form; for we shall have $\frac{m\phi + mR - n\phi}{nR + mf - mR + nR} = f$; and this will give $\phi = \frac{mfR}{nR + mf - mR} = \frac{mdR}{md - nd - nr}$, which equation reduced gives $\frac{mdR - ndR + mdr - nrR}{md - nd - nr} = f$.

But to reduce the number of symbols, let us put $\frac{m - n}{n} = a$, and consequently $m - n = a$, when $n$ is unity, and then this equation becomes $\frac{drR}{ar + aR - r} = f$.

and this may with propriety be called the universal dioptric theorem, by which the refracted focus of a ray may be determined after passing through any lens of a given density, or refracting power.

The theorems in the subjoined Table I. are all derived from the universal theorem thus determined, and will be of great use to the optician to determine the refracted focus of any lens, and for any distance of the radiant, which refracted focus, with parallel rays, will be always equal to the true, or nicely measured focus for a, where $d$ is infinite; whereas the focus determined from the old theorems in Table II. where the value of $a$ is omitted, is always the geometrical focus, determined on a supposition that the line of incidence is to the line of refraction in all glasses as 3:2, in which case $\frac{m - n}{n} = a$, i.e. $\frac{3 - 2}{2} = \frac{1}{2}$ invariably, and $\frac{1}{2} r$, in a double convex lens of equal radii, of whatever refractive power, $= f$. In order, therefore, to distinguish the focus determined from the theorems in Table I., from those arising from the theorems in Table II., we will always call the former the refracted focus; which is that from which the powers of a telescope or of a microscope are derived; and the second we will denominate the geometrical focus, which is that arising from the simple consideration of the radii of curvature, without reference to the refractive power of the glasses, otherwise than as we have stated; but is not-withstanding useful to opticians in the formation of the curved faces of their grinding and polishing tools; for when the curves of a lens of a given refractive power are to be formed, to produce a given refracted focus, as is frequently required in the nicer optical instruments, the refracted focus must first be converted, by means of the value $a$ of its refractive power, into the geometrical focus, and then the radii of curvature belonging to this calculated geometrical focus, will be proper for the tools of the lens of a given refractive focus. Hence we consider it as a matter of great practical importance, to give, in the same place, two tables, one for finding the refracted, and the other for finding the geometrical focus of such lenses as are usually applied in either a telescope or microscope of the refracting construction. In all cases where the glass has two radii, the first, as we have said, will be denominated by $r$, and the second by $R$.

But before we proceed to tabulate our theorems for both refracted and geometrical foci of single lenses, we wish it to be clearly understood by our readers, that the practical application of these theorems, and of others to be derived from them, to the purpose of actual construction of achromatic object-glasses, and of achromatic eye-pieces, is intended to be the leading feature of our article; for while volumes have been filled with abstract calculations, derived from formulae of the most celebrated mathematicians, the results of those calculations have never produced proper data for the use of opticians; more particularly with respect to achromatic object-glasses, which cannot be constructed from any calculations but what are grounded upon experimental examination of the identical specimens of glasses that are intended to be used. And we flatter ourselves, that the information we have to lay before our readers on this interesting subject, will be the first that has yet been published in such a practical form as will facilitate the labours of the working opticians.
**Table I.—Theorems for finding the refracted Foci of Lenses.**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Diverging</td>
<td>( \frac{d \cdot R \cdot r}{adr + ad \cdot R - R \cdot r} = f )</td>
<td>( \frac{d \cdot R \cdot r}{adr - ad \cdot R - R \cdot r} = f )</td>
</tr>
<tr>
<td>Parallel</td>
<td>( \frac{r \cdot R}{ar + a \cdot R} = f )</td>
<td>( \frac{r \cdot R}{ar - a \cdot R} = f )</td>
</tr>
<tr>
<td>Converging</td>
<td>( \frac{-d \cdot r \cdot R}{adr - ad \cdot R - R \cdot r} = f )</td>
<td>( \frac{-d \cdot r \cdot R}{adr + ad \cdot R - R \cdot r} = f )</td>
</tr>
</tbody>
</table>

**Lens with equal Radii.**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Diverging</td>
<td>( \frac{d \cdot r}{2ad - r} = f )</td>
<td>( \frac{-d \cdot r}{2ad + r} = f )</td>
</tr>
<tr>
<td>Parallel</td>
<td>( \frac{r}{2a} = f )</td>
<td>( \frac{-r}{2a} = f )</td>
</tr>
<tr>
<td>Converging</td>
<td>( \frac{-d \cdot r}{2ad - r} = f )</td>
<td>( \frac{d \cdot r}{2ad + r} = f )</td>
</tr>
</tbody>
</table>

**Lens with one Radius (R) infinite.**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Diverging</td>
<td>( \frac{d \cdot r}{ad - r} = f )</td>
<td>( \frac{-d \cdot r}{ad + r} = f )</td>
</tr>
<tr>
<td>Parallel</td>
<td>( \frac{r}{a} = f )</td>
<td>( \frac{-r}{a} = f )</td>
</tr>
<tr>
<td>Converging</td>
<td>( \frac{-d \cdot r}{ad - r} = f )</td>
<td>( \frac{-d \cdot r}{ad + r} = f )</td>
</tr>
</tbody>
</table>

**Lens with one Radius (R) negative, or Menifci.**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Diverging</td>
<td>( \frac{-d \cdot r \cdot R}{adr - ad \cdot R + R \cdot R} = f )</td>
<td>( -d = f )</td>
</tr>
<tr>
<td>Parallel</td>
<td>( \frac{-r \cdot R}{ar - a \cdot R} = f )</td>
<td>( \frac{-r \cdot R}{a} = f )</td>
</tr>
<tr>
<td>Converging</td>
<td>( \frac{d \cdot r \cdot R}{adr - ad \cdot R + R \cdot R} = f )</td>
<td>( d = f )</td>
</tr>
</tbody>
</table>

**Lens with both Radii (r and R) negative, or double concave.**

<table>
<thead>
<tr>
<th>Rays.</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Diverging</td>
<td>( \frac{d \cdot r \cdot R}{adr - ad \cdot R - R \cdot R} = f ), always negative.</td>
<td></td>
</tr>
<tr>
<td>Parallel</td>
<td>( \frac{r \cdot R}{ar - a \cdot R} = f ), always negative.</td>
<td></td>
</tr>
<tr>
<td>Converging</td>
<td>( \frac{-d \cdot r \cdot R}{adr + ad \cdot R - R \cdot R} = f )</td>
<td></td>
</tr>
</tbody>
</table>
TELESCOPE.

Table II.—Theorems for finding the geometrical Foci of Lenses.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Diverging</td>
<td>[ \frac{2 dRr}{dR + dr - 2Rr} = f. ]</td>
<td>[ \frac{2 dRr}{-dR - dr - 2Rr} = f. ]</td>
</tr>
<tr>
<td>Parallel</td>
<td>[ \frac{2Rr}{R + r} = f. ]</td>
<td>[ \frac{2Rr}{R - r} = f. ]</td>
</tr>
<tr>
<td>Converging</td>
<td>[ \frac{2 dRr}{dR + dr + 2Rr} = f. ]</td>
<td>[ \frac{2 dRr}{dR - dr - 2Rr} = f. ]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lenses with equal Radii.</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Diverging</td>
<td>[ \frac{dr}{d - r} = f. ]</td>
<td>[ \frac{dr}{-d - r} = f. ]</td>
</tr>
<tr>
<td>Parallel</td>
<td>[ \frac{dr}{d} = r = f. ]</td>
<td>[ \frac{dr}{-d} = f. ]</td>
</tr>
<tr>
<td>Converging</td>
<td>[ \frac{dr}{d + r} = f. ]</td>
<td>[ \frac{-dr}{d - r} = f. ]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lenses with one Radius (R) infinite.</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Diverging</td>
<td>[ \frac{2dr}{d - 2r} = f. ]</td>
<td>[ \frac{-2dr}{d + 2r} = f. ]</td>
</tr>
<tr>
<td>Parallel</td>
<td>[ \frac{2dr}{d} = f. ]</td>
<td>[ \frac{-2dr}{d} = f. ]</td>
</tr>
<tr>
<td>Converging</td>
<td>[ \frac{2dr}{d + 2r} = f. ]</td>
<td>[ \frac{2dr}{2r - d} = f. ]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lenses with one Radius (R) negative.</th>
<th>Unequal.</th>
<th>Equal.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diverging</td>
<td>[ \frac{-2dRr}{dR - dr + 2Rr} = f. ]</td>
<td>[ \frac{-2dRr}{2Rr} = -d = f. ]</td>
</tr>
<tr>
<td>Parallel</td>
<td>[ \frac{-2Rr}{R - r} = f. ]</td>
<td>[ \frac{-2Rr}{0} = f. ]</td>
</tr>
<tr>
<td>Converging</td>
<td>[ \frac{2dRr}{dR - dr + 2Rr} = f. ]</td>
<td>[ \frac{2drR}{2rR} = d = f. ]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lenses with both Radii (r and R) negative, or double concave.</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Diverging</td>
<td>[ \frac{2dRr}{-dR - dr - 2Rr} = f. ]</td>
<td>[ \frac{dR}{-d - R} = f. ]</td>
</tr>
<tr>
<td>Parallel</td>
<td>[ \frac{2Rr}{-R - r} = f. ]</td>
<td>[ \frac{dR}{-d} = f. ]</td>
</tr>
<tr>
<td>Converging</td>
<td>[ \frac{-2dRr}{dR + dr - 2Rr} = f. ]</td>
<td>[ \frac{-dR}{d - R} = f. ]</td>
</tr>
</tbody>
</table>
TELESCOPE.

As we explained how Table I. is derived from an universal dioptic theorem, we shall explain how the theorems in Table II. are deduced from one fundamental equation, on a supposition that the times of incidence and refraction in glasses are always as 3 : 2. Let I.N, in fig. 6, represent a convex lens, of its axis, O a radiant point therein, O A a ray proceeding from thence to A, a point in the surface L E N; then if C is the centre of convexity of that surface, C G, drawn through the point A, will be perpendicular to that surface in the point A; C A or C B is the radius, A f the refracted ray, and f the point which meets the axis after the first refraction. Let D B = d, C A = R, E B = r, the thickness of the lens; and let the sine of the angle of incidence O A G be called m, and the sine of the angle of refraction C A f or G A H be called n. Now, since the point A is supposed to be very near to the vertex B, O A may be confounded equal to O B = D = d, and in the triangle C A O, we shall have A O to A C as the angle C to the angle O; that is, D : R :: C : O. Also O B + B C = D + R will be as the opposite angle C A O or O G, the sines of both being the same. Then as m : n :: d + r :

\[
\frac{D + R - n}{m},
\]

which will be as the angle C A f; this, taken from the angle A C O = d, leaves the angle A f O

\[
= \frac{D m - R n - D n}{m}.
\]

Last, as the angle f : O :: A O or O B : A f or B f; that is, as

\[
\frac{D m - R n - D n}{m} : R :: \frac{D}{m} = B f, the distance of the point f
\]
in the axis, after the first refraction. But since there is a second surface L E N of the lens, there must necessarily be a second refraction of the ray O A to some other point in the axis, as F, in fig. 7. In this case, the refraction being out of a dense into a rare medium, the sine of incidence will be to that of refraction the reverse of what it was before, viz, as n to m; that is, the sine of I a f is to the sine of I a F as n to m, which, in the case of single refraction, was as m to n. Here let K f be called r, and E f = d; then there will be d : r :: K : f, and E f + E K = d + r, which will be as the angle f a K, or its complement I a f; therefore n : m :: d + r :

\[
\frac{d m + r m - d n}{n},
\]

which will express the angle I a F. Then I a F - a K F = \frac{d m + r m - d n}{n} = a K F. Now, as F : K :: Ka or K B : a F or E F; that is, as

\[
\frac{d m + r m - d n}{n} : d :: r :
\]

\[
\frac{n d r}{d m + r m - d n} = E F. But B f - B E = \frac{D R m}{D m - R n - D n} - t = d = E f; therefore, putting m - n = b, we shall have d = \frac{D R m}{D b - R n} - t = \frac{D R m - D b t + r n t}{D b - R n}.
\]

Also \( d n = \frac{D R m n r - D b t n r + r n n r}{D b - R n} \).

Again, \( d m + r m - d n = D b + r m \); if, therefore, we multiply the equation by b, and add thereto r m, we shall have

\[
\frac{d m + r m - d n}{D b - R n},
\]

Then

\[
\frac{d m + r m - d n}{D R m n r - D b t n r + r n n r} = E F.
\]

This last equation may be abbreviated, by substituting \( p \) for \( n \), that is, for \( m - n \), then we shall have

\[
\frac{p D R m - p D b t r + R n r}{D R m - D b t + R n t + D b m - R m n} = E F.
\]

Finally, if we take \( n = p \) in \( p D b t r \); and \( m - n = b \) in \( D b t r \), this equation will be finally reduced to this fundamental equation, viz.

\[
\frac{p D R m - D b t r + R n r}{D R m - D b t + R n t + D b m - p R m} = E F.
\]

The ratio of m to n being taken in glases as 3 : 2, we shall have

\[
\frac{m - n}{m} = \frac{2}{3} = 2 = p \text{ for a glases lens, and the equation will then fall and thus; viz.}
\]

\[
\frac{6 D R r - 2 D t r + 4 t R r}{3 D R - 3 D t + 2 R t - 6 R r} = E F = f;
\]

and when \( t \), the thicknes, is diffreged, we have from this fundamental theorem all the various theorems contained in Table II. for finding the geometrical focus under all the various circumstances that are likely to occur in the position of a single lens, where the refractive power is not adverced to.

To illustrate the respective uses of the theorems contained in the two preceding tables, we must suppose the ratio between the sines of the angle of incidence and of refraction known by some of the usual modes of determining it experimentally; and then, when the ratio of m : n is so determined, there will be \( \frac{m - n}{n} = a \), the symbol introduced in the theorems of the first table; when d is equal to the distance of the radiant, r the radius, and f the proper focus determined by real refraction through the glases used, the theorem for finding the value of a is \( \frac{d r - r f}{2 df} = a \).

For inculsance, Martin ground a piece of white flint-glases with a tool of 21.5 inches radius, into a double convex lens, and when a lamp was placed at the distance of 417.25 inches, the refracted focus was measured accurately, and found to be only 18.75 inches; whence, according to the theorem,

\[
\frac{417.25 \times 21.5 + 21.5 \times 18.75}{2 \times 417.25 \times 18.75} = 0.599 = a
\]

\[
= \frac{m - n}{n} \text{; and if we put } n = 1, \text{then } m \text{ will be } 1.599, \text{ for}
\]

\[
\frac{1.599 - 1}{1} = 0.599. \text{ When the sun is the radiant, then}
\]

\[
d \text{ becomes infinite, and the theorem becomes, as in the first table,}
\]

\[
\frac{r}{2 d}, \text{ which gives, in this case, } \frac{21.5}{1.198} = 17.94 \text{ for the}
\]

refracted
refracted solar focus; whereas, by Table II., the geometrical focus is

\[ \frac{dr}{da} = \frac{r}{\alpha} = 21.5. \]

If the refractive power of the glasses, and consequently the value of \( \alpha \), had been given, and it had been required to determine the radius of the tool that will grind the given glasses into such equal radii as will give the refracted solar focus exactly 17.82 inches, then the

\[ \frac{r}{2a} = f \]

becomes, by transposition, \( 2af = r \), and

\[ 1.298 \times 17.94 = 21.5 \]
as before. In a specimen of crown-glasses ground to the same radius, where \( d \) was 414.75 inches, \( \frac{dr + rf}{2df} \) gave \( a = 0.5318 \), and consequently \( m : n \)
as 1.5318 : 1, with which lens the true solar focus was

\[ \frac{21.5}{1.0636} = 20.214; \]

and if the lens had been a single convex, the true solar focus would have become

\[ \frac{r}{a} = \frac{21.5}{0.5318} = 40.428; \]

double the length of the former, while the geometrical focus for parallel rays, by Table II., would have been

\[ \frac{2dr}{d} = 2r = 43.0; \]

so that for many practical purposes, where \( m - n \) is known in the particular glasses used, the advantage of the theorems in Table I., over those in Table II., will be evident.

Again, let us suppose that the ratio of \( m : n \) is ascertained by a prism of any specimen of glasses, or by Dr. Wollaston's or Dr. Brewster's instruments for this purpose, and that it is known to be 1.599 : 1; then we know that \( 1.599 = \alpha \), as before; and let it be required to find the refracted focus with diverging rays, when the radiants are as before at the distance of 417.25 inches, and the radius of curvature of each surface 21.5; in this case the theorem is

\[ \frac{dr}{2ad - r} = f \]; or, in numbers, \[ 417.25 \times 21.5 \]

\[ \times 2 \times 0.599 \times 417.25 - 21.5 \]

\[ = 18.75, \]
as before; and in this way the terms given may be varied at pleasure, and the theorem made applicable to the case in question. If the rays had been converging in the last calculation, the theorem would have been

\[ \frac{dr}{2ad + r} = f \]; or, changing all the signs, (which are here negative, because the distance is more than infinite, that is, the rays more than parallel,) the same may be taken

\[ \frac{dr}{2ad + r} = f \],

\[ 417.25 \times 21.5 \]

\[ \times 2 \times 0.599 \times 417.25 + 21.5 \]

\[ = 17.204, \]

which is less than the focus of the last by 0.74 of an inch. In this case the rays must have passed through some other glass, in order that they may proceed in a state of convergence before they enter the lens in question, and the focus of that other glass is here considered as the radiant point from which the rays proceed in a state of convergence; and this consideration leads us naturally to inquire into the nature of a focus when two glasses are employed jointly to produce it, under the different circumstances of figure and distance.

Suppose the parallel rays A N and B M, in fig. 8, to fall on a plano-convex lens M N, with the curved face turned to the radiant, and to be refracted to its focus at F; then if another plano-convex lens be placed in the line of its axis, at any distance less than C F, so as to intercept the converging rays, they will be refracted still more, and will now converge into the shorter focus \( f \), which is therefore called the compound focus of both the lenses. The angle subtended at \( f \), where the eye is supposed to be placed, and which is called the optic angle, is now larger than that formed at \( F \) by the first lens, and is equal to what would be formed by the imaginary double convex lens \( E \), the focal distance of which would be \( Qf \). Now let C F be put = \( F \) for the focal distance of the lens M N; \( O P = y \) for the focal distance of lens G H; and \( Qf = x \) for the focal distance of the imaginary double convex lens \( E \); also let \( OF \), the compound focal distance, be \( = f \); and C O, the distance between the lenses M N and G H, be \( = D \). As the rays, which tend to the point \( F \), after leaving the lens N M, fall on the lens G H converging, let us call \( OF = d \), and then, by common optics, we shall have

\[ \frac{d}{y - f} = F - D; \]

from which equation we get

\[ F + y - D: F - D :: y : f; \]

and from this analogy the compound focal distance \( O \) is easily obtained. In like manner, the parallel rays L G and S H are refracted by the lens G H, now supposed to be the first lens, to the lens N M, as they proceed towards the point \( i \); but are refracted to the nearer point \( \phi \), which is the compound focus on the other side; and now we have \( CGy = \frac{F \phi}{F - \phi} = \gamma - D \);

whence \( F + y - D: y - D :: \phi = C \phi \), which is therefore known again, because of the similar triangles \( F N \), \( F G \), and \( F E \); \( F G \), and \( F E \); and because \( EF = NC \), we have \( CF: OF :: NC (= EQ) :: GO: OF \), and therefore, \( \frac{d}{y - f} = \gamma - D \); or

\[ \frac{d}{y - f} = \frac{F - D}{F + y - D} = \gamma - D; \]

whence \( F + y - D: y - D :: \phi = C \phi \), and, therefore, \( \frac{F \phi}{F - \phi} = \gamma - D \); and, being substituted for \( \gamma \), will give \( \frac{F \phi}{F + y - D} = \phi \); which being substituted for \( \gamma \), will give

\[ \frac{F \phi}{F + y - D} = \phi \];

which being substituted

for \( \phi \), will give

\[ \frac{F \phi}{F + y - D} = \phi \];

which being substituted

for \( \phi \), will give

\[ \frac{F \phi}{F + y - D} = \phi \];
of as much importance as magnifying power; and it will be seen hereafter, that there is a certain distance between the lenses that promotes this quality the most possible, whatever be the radii of the two lenses. This condition is fulfilled when \( x = \frac{1}{2} F \), that is, when the focus of the imaginary lens \( EE \) is just one half of that of the outer lens \( NN \); in which case the compound focus \( f \) will be in the middle of the line \( OO \), and the lens \( GH \) placed at half the focal distance of the imaginary lens. But it is not necessary that the object, or image of an object \( xx \), should be situated in the exterior compound focus \( f \); this focus may be supposed negative, that is, the image may be between the two lenses \( MN \) and \( GH \), as \( BA \) in fig. 11. which will always be the case when \( D \) is greater than \( y \); or, in other words, when the distance between the two lenses exceeds the focal distance of the inner lens \( GH \); for let

\[
F = 6, \quad D = 4, \quad \text{and} \quad y = 2, \quad \text{and we shall have} \quad \frac{6 \times 2}{6 + 2 - 4} = \frac{12}{4} = 3, \quad \text{as in the first instance. Neither is it necessary that}
\]

\[
\frac{x}{y - F - D} = x, \quad \text{for the focus of the imaginary lens} \quad EE \quad \text{which shall have its focus equal to the compound focus, which will always be positive while} \quad F + D \quad \text{is greater than} \quad y, \quad \text{but when less, then negative; and when} \quad y = F + D, \quad \text{the rays proceed parallel, and the focus is said to be infinite. The}
\]

compound focal distance in this case is \( \frac{x}{F - x} = f \), and must be affirmative when \( x \) is positive; but when \( D = 0 \), then \( f = x \). As an example, let the concave \( NN \) have a negative focal distance \( -F = 3 \), and let \( y = 2 \), while \( D = 1 \); then the focal distance of the imaginary or equal lens will be

\[
\frac{\frac{-6}{2} - 6}{2 - 4} = -1 = x, \quad \text{and the compound focal distance will be}
\]

\[
\frac{-3}{-3} \times \frac{3}{1} - \frac{1}{3}, \quad \text{or} \quad -\frac{12}{-3} = 4 = f. \quad \text{Whence, in}
\]

this case, \( f \) is equal to \( 2 FO \), whereas \( NNN \) was convex, we had the reverse, \( FO = 2 Fe \). When \( F = y \), and \( D = 0 \), i.e. when a concave lens and convex one are placed in contact, with their separate focal distances equal, then \( x \) becomes infinite, or, in other words, the rays emerge, and proceed in a parallel direction; but if the focal lengths are unequal, there will be a positive focus and magnifying power, when the convex has the shorter radius; for suppose \( -F = 3, \quad y = 2, \quad \text{and} \quad D = 0 \); then by the theorem

\[
\frac{F \times y}{F - y}, \quad \text{we shall have} \quad \frac{-6}{-1} = 6 = x, \quad \text{and in this case} \quad x = f = 6 \quad \text{likewise. From these instances it will be seen, on}
\]

examination, that the compound focal distance \( OF \), of the combined lenses, is nothing more than the focal distance \( f \), found

by the common geometrical theorem of optics,

\[
\frac{d r}{d - r} = f,
\]

adapted to the constant lens \( GH \), where \( OF = r \), and \( OP = f \), when the rays are diverging; or \( OF = -f \)

\[
\left( = -\frac{d r}{d - r} \right) \text{when the rays fall diverging on the said lens.}
\]

See Table II.

Our general theorem may be rendered more extensive in its application, by varying it according to the data; thus, if \( F, x, y, \text{and} \quad D \) be given to find \( y \), it will be

\[
\frac{F y - x D}{y} = y;
\]

to find \( F \) with the others given, it will be

\[
\frac{x D - xy}{y} = F.
\]

and to find \( D \), there will be \( F + y - \frac{y}{x} = D \). From

these analogies we may further observe, that we have also the ratio of the two compound focal distances to each other, \( OF, CF \), thus; as \( f \), so \( F - D \times y \), \( y - D \times F \); and, therefore, when \( f = \varphi \), then \( F = y \); or the said focal distances can never be equal, but when the lenses are equal. Lastly, we may observe, that since the parallel rays \( LG \), \( SH \), refracted through both the compound lenses, intersect the axis in the same point, \( O \), as it would do if it were refracted by the single lens \( EE \), as is evident by continuing it to \( R \); therefore, since \( GO = RO \), it will follow that the diameter \( KL \), of the principal pencil of rays \( K = L \), diverging from the focus \( C \), will be the same as it would have been, if it had proceeded directly to the single lens \( EE \); and, consequently, this combination of lenses makes no alteration in that respect.

Having now explained how the focal point of any lens, or pair of lenses, differently circumstanced, may be ascertained by one or other of the dioptic theorems, derived from the refractive power of glasses according to certain laws of nature, it will be proper to explain the different lenses in which the word focus is applied by optical writers under different circumstances, that our readers may not be at a loss to know in what sense it is to be taken, whenever it occurs in our subsequent details. The principal or solar focus of a lens, is that which is produced by parallel rays coming from an infinite distance, which that of the sun may be considered, and when the epithet refracted is added, it has reference to the particular glasses by which the rays are refracted; but when geometrical is expressed or understood, then glasses in general is meant; the virtual, refracted, or geometrical focus, is that which, in a concave glass, would be formed by the diverging rays continued to a point backwards through the glass till they meet, and is imaginary rather than real, and generally called negative: the focus arising from diverging rays passing through a convex lens is shorter, or nearer the lens, than the solar focus, and the radiant is supposed to be at a greater than an infinite distance, if such an expression is allowable; but as no such distance is in nature, converging rays can only be produced by their passage through a single lens before they fall on a second, which is often the case in the construction of optical instruments; but the focus from diverging rays is always more remote than the solar focus from the lens that produces it; and, in consequence of the reference it has to the situation of the radiant or illuminated object, is denominated the proper and sometimes the relative focus; for, as the radiant approaches the lens, the proper focus recedes in the same line, and vice versa, as we have more fully explained under the article Lens. Because the radiant and corresponding focus may change places at any time, the two points where they are placed, at opposite sides of the lens, are called the conjugate foci, from their being so closely allied, that one cannot move without the other. When the radiant is placed therefore in the principal
pal or solar focus of a lens, the rays will emerge and continue parallel, on account of the other conjugate focus being at an infinite distance; and for the same reason, when an object, viewed by a single lens, is placed in its principal focus, the rays will enter the eye in a parallel state, and will be converged to a point on the retina by the humour of the eye, and a number of these rays crossing will form a picture behind the eye of the object viewed: for, what is one of the most remarkable properties of refracted rays coming from a luminous object, they bring with them not only the figure, but the colours of the object viewed, and form a picture or image of it, in the place where the different pencils of rays cross one another; and, what is equally remarkable, this picture is not visible until all extraneous light is excluded. We will not pretend to explain this wonderful property of a lens, that directs the transmitted rays so as to form a picture of a distant object in its focus, but merely mention here, that, without it, no telescope, microscope, camera obscura, or magic lantern, could be constructed on dioptric principles.

After having shown, by our foregoing theorems, how any focus, solar, proper, conjugate, or virtual, may be determined of a single lens, or of a combination of two lenses with the intermediate distance given, the same might be done for any number of lenses, by considering the compound focus of the first two lenses, as the focal distance of a single lens, to be combined with the third lens, and so on till all the lenses are included. Dr. Smith has given, in his Optics, chap. v. the application of Cotes's theorem "for determining the apparent distance, magnitude, situation, degree of distinctness and brightness, the greatest angle of vision and visible area of an object seen by rays successively reflected from any number of plane or spherical surfaces; or successively refracted through any number of lenses of any sort, or through any number of different media, the surfaces of which are plane or spherical, with an application to telescopes and microscopes;" which account our readers may consult with advantage: but as the illustrations and demonstrations demand more plates than can be given to this article, in addition to the eight we have had occasion to introduce, we have been obliged merely to refer to them in this place.

We propose, however, to substitute some practical theorems, derived from our tables, which we have been favoured with by Mr. Tulley, that will be found extremely useful to the working optician, who must be supposed, generally speaking, unable to transform the theorems which we have given in our tables, for the purpose of finding the focal distance of a lens, or of a combination of lenses already constructed; and which tabulated theorems are principally useful for determining the powers, and for explaining the construction of an instrument to which they are applicable.

Practical Theorems.

1. When $r$, the radius of one face of a lens, is given, and $F$, its principal geometrical focus, to find $R$, the radius of the other face, the theorem is \( \frac{rF}{2r-F} = R \) for a double convex: thus, let $r = 9$, and $F = 10.3$ inches, and the calculation will be \( \frac{9 \times 10.3}{9 \times 2 - 10.3} = \frac{92.7}{7.7} = 12 \) nearly, the truth of which may be proved by our theorem for parallel rays with a double convex lens, in Table II. viz. \( \frac{2rR}{R+r} \), or

\[ \frac{9 \times 12 \times 2}{9 + 12} = \frac{216}{21} = 10.3, \] as before very nearly, for the required focus; and when the refractive power or ratio between the lines of incidence and of refraction is given, this geometrical may be converted into the refracted focus by the quantity \( 2a \), used as a divisor; or, on the contrary, the refracted focus may be turned into the geometrical focus by using \( 2a \) as a multiplier.

2. With a meniscus lens, where \( r \), the convex side, is given, together with $F$, the theorem is \( \frac{rF}{F-2r} \) for finding $R$, the concave side.

3. But when the concave side of a meniscus is given with the focus, to find the convex, the theorem becomes \( \frac{rF}{2r+F} = R \).

4. When the focus of a double convex lens, and the ratio between its two radii, are given, to find the actual radii $r$ and $R$ respectively, first our theorem in Table II. \( \frac{2rR}{R+r} = F \), will give the focus, on a supposition that one side is unity, and the other any given quantity that forms the other term of the ratio; suppose as \( 1 : 4 \); thus \( \frac{1 \times 4 \times 2}{1+4} = 1.6 \), the rational focus; then suppose the focus given \( 12 \), and there will be this analogy, as \( 1.6 : 1 : 12 : 7.5 = r \); and also as \( 1.6 : 4 : 12 : 30 = R \), or otherwise \( \frac{12}{1.6} \) \( = 7.5 \), and \( 7.5 \times 4 = 30 \) will be the respective radii $r$ and $R$, as before.

5. When the compound focus of two convex lenses, and the separate focus of one of them, are given, to find the separate focus of the other, that shall be suitable to form the combination; if we put $f$ the focus of the lens given, $F$ the combined focus, and $x$ the focus of the lens required, the theorem for this useful purpose is \( \frac{fF}{f-F} = x \); for example, let $f = 36$, and $F = 15$, then \( \frac{36 \times 15}{36-15} = 25.7 \) nearly, for the focus of the lens required, which is a positive focus, because both lenses are double convex, and might be plano-convex, or one double convex and the other plano-convex, or even meniscus, as the ratio of the radii $r$ and $R$ may be disregarded when the focus only is the object of consideration. But whatever be the forms of the curves relatively, $F$, the compound focus of two lenses, or more, will, in practice, be the refracted focus; and, therefore, in this theorem, $f$ and $x$ will also be the refracted focus of the separate lenses, and, consequently, when the geometrical focus of $f$ is given, it must be converted into the refracted focus by the divisor $2a$, before the calculation is entered upon; it being necessary that all the terms be of the same denomination.

6. If $F$, the compound focus, be longer than $f$, the focus of the given convex lens, as is the case in the construction of a double achromatic object-glass, then the lens required will be concave, of which the focus $x$ is sought, and the theorem becomes \( \frac{fF}{F-f} = x \). Let us, in this example,
TELESCOPE.

If the lens considered is one of the plano-convex, as we shall see hereafter.

In considering the theory of a telescope, (of either the refracting or reflecting sort,) our attention must be directed to two essential particulars, the image of an external object formed at the focus of the object-glass, or of the large speculum, as the case may be.; and the means by which this image is rendered visible to the eye of an observer: and accordingly as the dimensions, shape, quality, arrangement, and number of the lenses and specula vary from each other, may the constructions be said to differ, though the effect to be produced be intended to be the same. That telescope, of whatever construction, must be considered the most perfect, which exhibits to the eye an image of distant objects the most distinctly, as to light, colour, shape, and proportion; and which, at the same time, magnifies this image sufficiently to afford a minute examination of it, in a field of view that is proportionally large to contain it. That quality, which apparently amplifies the object, or rather the image of the object, by enlarging the angle subtended at the pupil of the eye, therefore called the visual angle, is denominated the power of the telescope; and in all telescopes, whatever their other qualities may be, the light is diminished as the power increases, so that in every telescope there is a limit to its useful power, which depends on the quantity of light emitted or reflected by the object to be viewed; and it would answer no good purpose to increase the power so much, that a corresponding deficiency of light may render the object invisible. Hence different powers may be applied, with advantage, to objects differently illuminated; and hence different eye-pieces are usually appropriated to the same telescope, particularly when it is destined for celestial, as well as for terrestrial observations. But we propose to explain first the theory of those telescopes which are usually called refracting or dioptric, and afterwards of cata-dioptric, or those that magnify by the aid of reflection.

Under our article LENS we have said (in section 5.) that "the images of objects, opposed in any manner to a convex lens, are exhibited inverted in its focus," and that "they will be represented distinctly, and in their natural colours, on a paper held at the opposite side of the glafs, at nearly the distance of its proper focus, especially if the room be darkened; and in section 7. we have said, that "the diameter of the image of an object delineated beyond a convex lens, is to the object itself, in the ratio of the distance of the images to that of the object," so that the more distant an object is from the lens, the smaller is the image of that object; and also the shorter is the focus of the lens, until the distance is such, that the rays fall on its surface parallel, or nearly so. Likewise (in section 8.) we have shewn, that "if the eye be placed in the focus of a convex lens, an object viewed through it appears erect and enlarged in the ratio of the distance of the object from the eye, to that of the eye from the lens, if it be near; but infinitely, if remote;" and what is said of an object itself, when viewed through a convex
convex glass, is equally true of the image of an object so viewed. It is easy, therefore, to conceive, how two lenses of different focal lengths may be so arranged as to make a telescope that will at the same time invert and amplify, as to fence, a distant object: for, first, a lens of a long focal distance will form a large image of the object opposed to it, which image, by the crossing of the rays at the focal point, will be inverted a little beyond the solar focus: and secondly, an eye applied to a lens of short focal distance, which is held so that its focal point may coincide with that of the larger lens, will receive parallel rays, and will throw the said image in an amplified or magnified state, and in the same inverted position in which it is exhibited; which image, by being enclosed in a darkening tube, appears with all its natural colours. The power of such a telescope, which is the simplest that can be made, is ascertained by finding how often the focal length of the small or eye-lens is contained in the focal length of the larger or object-lens: the quotient of such division will represent the power. But if the eye-lens were made concave, and placed within the focal point of the object-lens, as much as is equal to the virtual focus of the concave lens, then the converging rays will become parallel, and afterwards, on entering the eye, which may be considered as a lens of short focus, will converge, and form a direct image on the retina; and though the total length of the telescope will be shortened by this latter arrangement, by twice the focal length of the eye-lens; yet if the virtual focus of the concave eye-lens be the same as the focal distance of the convex lens, the power will be the same, and may be ascertained by the same process. With a convex eye-lens, the instrument arising out of the first arrangement is the original astronomical telescope, and that arising out of the second is the Galilean. The field of view in the former construction is directly as the effective breadth of the eyeglasses, and inversely as the interval between the lenses; but in the latter, the field is directly as the diameter of the pupil of the eye, and inversely as its distance from the lens.

In both these constructions, the smallest power, or, which is the same thing, the shortest focus of the object-glass is with parallel rays; and as the distance of the object, or radiant point, decreases according to the principles of optics laid down under lens, the focal distance of the object-glass increases: and thus the power increases as the rays become more and more diverging, from a gradual decrease of distance; so that, in fact, the same telescope magnifies a near object considerably more than it does a distant one; for while the focus of the object-glass increases after a certain law, inversely as the distance decreases, the focus of the eye-glasses remains unaltered; and, consequently, the power varies inversely as the distance, or directly as the variable focus of the object-glasses.

To remedy the inconvenience of inversion of the object in the astronomical telescope, and also of the contracted field of view of the Galilean, two more glasses were added to the eye-tube, as we before stated, to render the image of the object erect, or rather to form a second image in a contrary position. The primary intention of these two additional eye-glasses was not to alter the power, but merely to give an erect position to the apparent object; the original lens therefore remained as before, and was called the field-glasses, as being nearest to the field of view of the old arrangement of two glasses, while the next glass was called the second eye-glas, and was placed at double its focal distance from the field-glasses, so that the rays might be parallel, and that they might form another image in its focus: this being the image of an image, was denominated the secondary image, and became erect by a second crossing of the rays, and was then viewed through the outermost or first eye-glass, in the same manner as the first or inverted image was viewed through the original eye-glass. This telescope was denominated the terrestrial telescope; and while the focus of all the three eyeglasses were similar, its power and field of view remained the same as in the astronomical telescope.

The theory of these three constructions will be more clearly understood by a reference to Plate XXV. of Astronomical Instruments, in which fig. 1. shews the arrangement of the glasses in the astronomical telescope:—fig. 2. that of the glasses in the Galilean, and also in the common opera-glasses, except that in it the object-glass is usually achromatic; and fig. 3. exhibits the scheme of glasses that compose the original terrestrial telescope, or perspective glasses, before the subsequent improvements took place. In all these figures the same letters denote the same parts, as far as they extend; and the magnifying power of each may thus be demonstrated to be as we have before stated it. Let A B represent the object-glasses, and C D the eye-glasses of fig. 1.; and let H F I and G F M be considered as two pencils of light, proceeding in straight lines from the opposite ends of a distant arrow, and crossing each other at the centre F of the said object-glasses; also let the dotted line be a pencil coming from the middle of the arrow, and falling perpendicularly on the same central point, so as to pass along the axis of the glasses F L E. Under these circumstances, the angle G F H = I E M, the opposite angle, is that under which the arrow appears to the natural eye at F; but the angle I E M = C K D, is that under which the image I M of the distant arrow is viewed, when magnified by the eye-glasses C D. But the angle I E M is to the angle I F M, as L F to L E, or as the focal distance of the object-glasses to the focal distance of the eye-glasses; therefore

N O, and T U, in fig. 3. have equal foci, the secondary direct image P Q is equal to the primary inverted one I M, and appears under the same angle.

Now if all the rays of light had been, as they were supposed to be before Sir Isaac Newton's experiments, homogeneous; and if a double convex lens, of equal curvature on both sides, had been found to refract all these homogeneous rays into one focal point, without any aberration, either lateral or longitudinal; then the telescopes, we have just noticed, would have been sufficiently perfect for all the purposes of exhibiting a well-defined picture of the object viewed in a magnified flat; and the power might have been increased to almost any extent, by varying the ratio between F L and E L; that is, by increasing the focal distance of the object-glasses, or by lengthening the focal distance of the eye-glasses, or by both; but it was soon found that the rays which enter a lens at or near the edges, are refracted to a point nearer to its surface than the rays that are transmitted near the centre; and also that the rays of different colours are differently refracted, even from the same point of the lens, so as to meet in the line of the axis at different distances from the nearest surface of the lens. The former of these deviations, being occasioned by the spherical figure of the lens, is called the spherical aberration; and the latter, arising out of the nature of solar light itself, is called the prismatic, chromatic, or Newtonian aberration. The difficulties in the formation of the image, occasioned by these aberrations of the rays of light, became an object of Sir Isaac Newton's attention, and he soon discovered that, whatever mechanical means might effect in the shape of the curve that might rectify the spherical aberration, the prismatic aberration would remain
TELESCOPE.

remain to long as one substance only remained to be the medium of refraction. The ingenious Huygens, however, supposing that the diminution of the spherical aberration would contribute greatly to the improvement of the telescope, instituted some experiments and calculations, which greatly promoted the science of Dioptries. He found, that the lengthening of the radius of convexity of an object-glasf shortened the refracted line of the curvature, and lengthened the thickness of the glafs, on which, with equal apertures, the spherical aberration seemed to depend; and also that, in a simple eye-glasf, the aberration from the figure was greatest in a double convex lens, when the curves of the two faces were from the same radius; and also that it increased as the radius shortened. The ratio 1 : 2 being found to have the greatest aberration, and 1 : 2 to have the least, an investigation was instituted, from which it was at length proved, that the aberration in a double convex lens is the smallest possible, when the radii of convexity are to each other as 1 : 6; the face 1 being turned to the radiant or object to be viewed. From these experiments originated the famous Huygenian telescope of 125 feet focal distance, and a table of apertures corresponding to the respective focal lengths of the object and eye glases, that would exhibit an image equally well defined; which calculations were the basis of all the long or aerial telescopes that were in use for a whole century; but which are now superseded by the short achromatic refractors.

The fame ingenious author of *opticks* discovered, that the aberration arising from the curved figure of a lens might be still further diminished, by substituting two leaves in the eye-piece of a telescope instead of one; which discovery was the foundation of all the improved eye-pieces that have been since adopted, under different arrangements of intermediate distance, and with different degrees of curvature. But before we can explain how the indistinctness arising from both the spherical and prismatic aberrations of mixed rays, may be in a great measure counteracted, (on which important consideration, the excellence of modern improved telescopes depends,) it is necessary to examine this subject further, and to shew how the circle of aberration of mixed rays arising from their unequal refrangibility, and also the lateral and longitudinal aberrations arising from the spherical figure of refracting and reflecting surfaces, may be mathematically determined. In doing this, we shall avail ourselves of Dr. Smith's propositions, which are at the same time perspicuous and conclusive.

Prop. I.

**Aberrations.** "Let the common fine of incidence be to the fine of refraction of the least refrangible rays, as I to R, and to the fine of refraction of the most refrangible rays, as I to S; and the diameter of the least circular space, into which heterogenous parallel rays can be collected by a spherical surface, or by a plano-convex lens, will be to the diameter of its aperture in the constant ratio of S − R to S + R − 2 I."

For let an heterogeneous ray PA (Plate XXVI. fig. 1.) fall upon a spherical surface ABC, and let it be separated by refraction into the rays AF, A f, cutting the axis EC, drawn parallel to PA, in F and f. Take the arc CB equal to CA, and let another heterogeneous ray PB, coming parallel to PA, be refracted into the lines BF, B f, cutting the two former rays in R and S. Join RS, and produce it till it meets the incident rays produced in I and K, and the perpendiculars EA, EB, to the refracting surface at the points A, B, in H and L. And when A B, the breadth of the aperture or of the pencil, is but moderate, and consequently the refractions at AB but small, the angles of incidence and refraction HA I, HA R, HA S, or the arcs that measure them, or their perpendicular subtenses HI, HR, HS, will be to each other very nearly in the same given ratios as those of the fines I, R, S, of those angles. And disjoinly, the differences of those subtenses will be proportionable to the differences of those fines; that is, the line RS : RI = S − R : R − I, and doubling the consequents, Rs : 2 R or I K : RS = S − R : 2 R − 2 I; and conjointly, RS : I K, or AB : S − R : S + R − 2 I. From this given ratio of RS to AB, in which they increase or decrease together, it appears that all the intermediate rays which fall upon AB, will pass through RS. And when parallel rays fall perpendicularly upon the plane side of a plano-convex lens, they are refracted only at their emergence from its convex surface; and to the aberrations are the same in both cases. Q. E. D.

**Corol. 1.**—Hence the diameter RS of the circle of prismatic aberrations that contains all the incident rays, is a 55th part of the diameter AB of the aperture of a plano-convex glafs, whatever be its focal distance. For supposing with Newton the prismatic spectrum divided into seven colours, and AR and AS to be the outermost red and violet rays, their fines of incidence and refractions I, R, S, are to each other as 50, 77, 78: whence S − R is to S + R − 2 I, as 1 to 55.

**Corol. 2.**—The diameter of the least circle that can receive the rays of any single colour, or of several contiguous colours, is also determinable from the proportions of their fines. Thus all the orange and yellow is contained in a circle, whose breadth is the 26th part of the breadth of the aperture of the plano-convex glafs; the fines of the outermost orange AR, and yellow AS, being the common fine of incidence, as 77 4 and 77 5, to 50.

**Corol. 3.**—In different surfaces, or plano-convex glases, the angles of prismatic aberration RAS are as the breadths of the apertures, A B, directly, and as the focal distances C, F, inversely; because any angle, as RAS, is as its subtense RS directly, and as its radius AR or CF inversely.

**Lemma.**—The virded fines A B, A C, of very small arcs BD, CD, (figs. 2, and 3,) of unequal circles B D C, C D H, that have the same right line AD, are reciprocally proportionable to their diameters B G, C H, very nearly; that is, A B : A C :: C H : B G.

For since the rectangles under B A G and C A H are each equal to the square of AD, and consequently to each other, their sides are reciprocally proportionable; that is, A B is to A C as A H to A G, or as C H to B G very nearly, when the virded fines are incomparably less than the diameters themselves. Q. E. D.

**Prop. II.**

"When homogeneous parallel rays NA, EC, (fig. 4.) fall upon a spherical surface AC, whole centre is E, the longitudinal aberration FT, of any refracted ray AT from F, the focus of the pencil, is to the virded fine of the arc AC, intercepted between the point of incidence and the axis ECF, in the given ratio of the square of the fine of refraction, to the rectangle under the fine of incidence, and the difference of the fines very nearly; and the aberration is the same when the rays fall perpendicularly upon the plane side of a plano-convex lens."

For when the refraction is made in the passage of a ray NA from a denser to a rarer medium, then the interference T, of the refracted ray AT, with the axis ECF, lies between the refraacting surface and its focus F. With the centre T and semi-diameter TA, having described the arc AD, cutting the axis in D, draw the fine AP of the arcs AC,
AC, AD, and also EN and EM, the lines of incidence and refraction, for which put n and m; then because the triangles EMT, ATP, are similar, it will be as ET : TA or TD :: (EM : AP or EN ::) EF : FC and disjunctly, TF : EF :: (CF - TD or TF - CD : FC; and alternately, TF : TF - CD :: EF : FC; and disjunctly, TF : CD :: (EF : FC :: m : m - n. Again, since (PD : PC :: CE : DT or FC and conjointly) CD : CP :: (EF : FC ::) m : n; by compounding this and the foregoing proportion, it will be as TF : CP :: m : m - n. Q. E. D.

Corol. 1.—The segment ACPBA may be considered as a plano-convex lens; and when rays fall parallel upon its plane side, the longitudinal aberration of the extreme ray falling upon A is equal to 2 of its thickneps PC, as appears by putting 3 and 2 for m and n respectivly.

Corol. 2.—Also this aberration FT = \( \frac{m m}{m - n} \times \frac{A P^3}{2 EC} \). For PC = \( \frac{A P^3}{2 EC} \) very nearly, and

\[ EC = \frac{m - n}{n} \times CF. \]

Corol. 3.—Let the refracted ray ATG produced, cut the line FG, perpendicular to the axis, in G, and the lateral aberration FG = \( \frac{m m}{n n} \times \frac{A P^3}{2 EC} \). For PC = \( \frac{A P^3}{2 EC} \); and

\[ FG : TF :: A P : T P, \text{ or } CF \text{ or } \frac{n}{m - n} \times CE. \]

Corol. 4.—When the semi-diameter of the convexity or the focal distance is given, the longitudinal aberrations arising from the figure are as the squares, and the lateral aberrations as the cubes, of the linear apertures of a plano-convex lens.

**Prop. III.**

"When parallel rays QA, EC (fig. 5.) are reflected from a spherical concave A C B, whose centre is E, and whose aperture, A C B, is but small, the longitudinal aberration TF, of the extreme ray AT, from the geometrical focus F, is equal to half the verfcd fine CP of the semi-aperture AC very nearly."

In fig. 4. imagine EM, the line of refraction, to be diminished to nothing, and then to become negative and equal to EN, the line of incidence, and the refraction of the ray to be changed to reflection, as in fig. 5.; and by the former proposition it will be, as TF : CP :: m : m - n, n :: n : n - 2 n :: 1 : 2.

But the particular proof is this: By the last lemma, the verfcd fine CP nearly equals half the verfcd fine PD of the arc AD, whose centre is T, and semi-diameter TA or TE, or half the semi-diameter of the arc AC nearly. But 2 TF = 2 TE - 2 EF = ED - EC = CD exactly, or CP nearly. Therefore TF = \( \frac{1}{2} \) CP nearly.

Corol. 1.—We had 2 TF = CD exactly, which is the excess of the secant ED of the arc AC above its radius EA. For joining AD, the angle DAE in the semicircle DAE is a right one.

**Corol. 2.**—The longitudinal aberration TF = \( \frac{A P^3}{4 CE} \). For CP = \( \frac{A P^3}{2 EC} \) nearly.

**Corol. 3.**—The lateral aberration FG = \( \frac{A P^3}{2 CE} \). For

\[ FG : FT :: A P : P T, \text{ or } \frac{1}{2} CE \; \text{nearly.} \]

**Corol. 4.**—When the diameter of the concave or its focal distance is given, the longitudinal aberrations are as the squares, and the lateral ones as the cubes of the diameters of the apertures.

**Prop. IV.**

"When parallel rays of any one sort are refracted by a plano-convex object-glas, or when rays of all sorts are reflected by a spherical concave, the diameter of each circle of aberration caused by the sphericalnefs of the figures, is equal to half the lateral aberration of the extreme ray in each, and therefore is given by the former propotions."

Let a Y T be any refracted or reflected ray, cutting the axis E C T in \( \tau \) (fig. 6 and 7), and the extreme ray A TG, that comes from the contrary side of the axis, in Y. Draw Y X perpendicular to the axis; and supposing the line ATG immovable, as the point of incidence \( \alpha \) moves from the vertex C, the perpendicular XY will still increase, because the angle C \( \theta \) a continually increases, and afterwards will decrease, because the line T \( \tau \) continually decreases; and when XY is the greatest, it is evident that all the rays, incident upon the same side of the axis as itself, will pass through it. To find its greatest quantity, let the incident ray \( q \) cut the chord A P B in \( \beta \), and supposing the variable aperture \( P \beta = \nu \), the variable TX = \( \kappa \), and the given lines PA = \( \alpha \), PT = \( \beta \), TF = \( \beta \) by Cor. 4. Props. II. and III, the aberration \( FT \) is to the aberration \( FT' \) (b) as \( \nu a \) or \( P \beta \nu \) to \( P \alpha \)."

Therefore \( FT = \frac{\nu a}{\alpha a} \), and hence \( TF - FT = T \tau = \frac{b}{a a} \times \nu a \). Again, \( PT (f) : PA (a) :: TX (x) : XY = \frac{a x}{\nu} \); also \( \nu a (\nu) :: \nu \tau \) or \( PT (f) :: XY (\frac{a x}{\nu}) : X \tau = \frac{a x}{\nu} \). Hence again, \( T \tau \), or \( X \tau + XT = \frac{a x}{\nu} + \frac{b}{\nu a} \times \nu a - \nu a \) found before; or \( \frac{a}{\nu a} \times \nu a + \nu a = \frac{b}{\nu a} \nu a + \nu a - \nu a \). Whence \( \frac{x}{\nu} = \frac{b}{\nu a} \nu a \) and therefore \( x \tau \) is the greatest possible when the rectangle \( \nu a - \nu a \) or \( P \beta \nu \beta B \) is greatest, that is, when its sides \( P \beta \beta B \) are equal, or when \( \nu = \frac{1}{2} a \). Substitute this value for \( \nu \) in the last equation, and it gives the greatest value of \( x = \frac{1}{2} b \) or the greatest \( TX = \frac{1}{2} TF \); and therefore the greatest \( XY = \frac{1}{2} FG \), because \( TX : XY :: TF : FG \); and this \( XY \), turned about the axis \( PX \), describes the circle of aberrations through which all the rays falling upon \( AB \) will just pass. Q. E. D.

**Prop. V.**

"The circle of aberrations caused by the sphercialnefs of the figure of the object-glas of a telescope, compared with the circle of aberrations caused by the unequal refrangibility of rays, is altogether inconsiderable.

For if the object-glas be plano-convex, and the plane side be turned towards the object, and the diameter of a sphere, whereof this glas is a segment, be called D, and the semi-diameter of the aperture of the glas be called S, and the fine
fine of incidence out of glass into air be to the fine of refraction as \( n \) to \( m \); the rays which come parallel to the axis of the glass shall, in the place where the image of the object is most distinctly made, be scattered all over a little circle, whose diameter is \( \frac{m^3}{n^2} \times \frac{1}{DD} \) very nearly, if they were all equally refrangible. As for instance, if the fine of incidence \( n \) be to the fine of refraction \( m \) as 20 to 31, and if \( D \), the diameter of the sphere to which the convex side of the glass is ground, be 100 feet, or 1200 inches, and consequently the telescope about 1200 feet long, and \( S \), the semi-diameter of the aperture, be two inches; the diameter of this circle of aberrations, that is \( \frac{m^3}{n^2} \times \frac{1}{DD} \), will be

\[
\frac{31 \times 31 \times 8}{20 \times 20 \times 1200 \times 1200}
\]

or \( \frac{\pi}{4} \) parts of an inch.

But the diameter of the little circle through which these rays are scattered by unequal refrangibility, will be about the 55th part of the breadth of the aperture of the object-glass, which is here four inches. And therefore the aberration arising from the spherical figure of the glass, is to the aberration arising from the different refrangibility, as \( \frac{1}{200} \) to \( \frac{1}{5449} \), and therefore, being in comparison so very little, deserves not to be considered in the theory of telescopes. If we suppose the little circle of aberrations arising from unequal refrangibility, to be 250 times narrower than the circular aperture of the object-glass, it would contain all the orange and yellow, and would permit the other fainter and darker colours to pass by it, which perhaps may scarcely affect the sense; yet even in this case, the aberration caused by the spherical figure, would be to the aberration caused by the unequal refrangibility, in a 100-feet telescope, but as \( \frac{5449}{250} \) to \( \frac{5449}{200} \), or only as 1 to 1200, which sufficiently proves the proposition. Q. E. D.

Corol. 1.—If the focal distances and apertures of a reflecting concave and plano-convex glass be both the same, the diameter of the circle of aberrations, caused by their figures, will be above 30 times less in the reflector than in the refractor. For these diameters are

\[
\frac{A^3}{16CF^2} \text{ and } \frac{mm}{m-n} \times \frac{A^3}{4CF^2}
\]

which are as \( \frac{1}{2} \) to \( \frac{m^3}{m-n} \) or \( \frac{31 \times 31}{11 \times 11} \).

Hence, if the length of each telescope be 100 feet, the lateral aberrations in the reflector would be 30 × 5449, or 163470 times less than the lateral aberrations caused by unequal refrangibility in the refractor.

Corol. 2.—The number of pencils, some of whose rays are mixed together in every point of a confused picture, is as the area of the circle of aberrations of the rays in any one pencil; and consequently the mixture of the rays of different pencils, caused by the sphericalnares of the figure of an object-glass, if they were all alike refrangible, would be to their mixture caused by their unequal refrangibility, as 1 to 5449 × 5449, or 20691601 in the present instance. For conceiving any point in the confused picture to be a centre of a circle of aberration, it is manifest that all other equal circles of aberration, whose centres fall upon the first-mentioned circle, will cover its centre, that is, some rays of as many pencils will be mixed in this centre as there are points in the circle itself; or, which is the same thing, the number of pencils mixed in this centre is as the area of the circle of aberrations.

Double achromatic Object-glasses.—From these five propositions, and the corollaries deduced from them, in all of which the ratio of the fines of the angles of incidence and of refraction of air out of glass is taken as 3 : 2, (which answers nearly to the French plate-glasses,) our readers will see, that when any single lens is used as the object-glass of a refracting telescope, there will be not only fringes of colour, but indistinctness in the image formed at its focal point, arising respectively out of the two kinds of aberration, the prismatic and the spherical. But Dollond has shown, that these aberrations are not the same in all sorts of glasses: the former depends on the dispersive power of the glass used, and the latter on the ratio of the radii of curvature of the two surfaces of the lens. The dispersive power of a prism of any specimen of glass will be to that of another like prism of a different specimen, as the lengths of the prismatic spectra, formed by them, are respectively to each other: and if the foci of two lenses of different dispersive powers, one convex, of crown-glasses for instance, and the other concave, of flint, be made directly as their dispersive powers, and be placed contiguous, so that the convex lens may receive the rays first, and be of the shorter focus, or thicker, its dispersive power will be so counteracted by the opposite dispersive power of the other thin lens of longer focus, that the extreme or prevailing colours of the primary spectrum, being reversed, will both disappear; and a secondary spectrum, composed of the remaining intermediate colours, will be very inconsiderable in a good achromatic object-glass thus composed. If the refracted focal distances of the two lenses remain unaltered, when duly proportioned, as \( 2 : 3 \), or nearly so, the proportion of the radii of the surfaces may be altered at pleasure, so as to produce their due proportions of spherical aberration. To effect the definable purpose of banishing the spherical aberration as much as possible, the optician is obliged to calculate the aberrations belonging to convex lenses of different unequal radii, in order to make the contrary aberrations of the concave as equal thereto as may be; and for this purpose the general theorem of Huygens is peculiarly adapted, which we shall, therefore, introduce and exemplify here, before we proceed to the construction of an achromatic object-glass. According to this theorem, if we put \( r \) for the radius of the first surface of any lens, or that which first receives the incident rays; \( R \) for the second surface; and \( T \) for the thickness of the lens: then the aberration arising from the figure of any lens, concave or convex, will be

\[
\frac{27r^3 + 6rR + 7R^3}{6xR^2} \quad \text{or} \quad \frac{6xR^2}{6xR^2}
\]

Martin's New Elements of Optics, part vi. chap. iii. and Dr. Smith's Optics, book 2. chap. xiii.) When the centres of the curves are on opposite sides of the lenses, the signs are as here put down; but if these centres are on the same side as in a meniscus, then the sign of \( r \), or of \( R \), must be negative, as the case may require. For instance, let us first put \( r \) and \( R \) equal, and each \( = 1 \); then, as unity is not altered by multiplication or division, we shall have the simplest case, viz.

\[
\frac{27 + 6 + 7}{6 \times 2 \times 2} = \frac{1}{4}, \text{ or } \frac{1}{2} \text{ of } T
\]

But if we reverse the sides in position, by making \( r = 2 \), and
and $R = 1$, then the result will be different, viz. 
\[
\frac{108 + 12 + 7}{6 \times 9} = \frac{127}{54}, \text{or nearly } \frac{127}{54} \text{ of } T. \text{ The aberration here is more than in the former position, in the ratio of } 127:54; \text{ and this is, therefore, called the } \text{second order aberration; }
\]
that being always called the left, where the frill surface has a shorter radius than the second. If we suppose the radius of the different, having their focal distances, their breake, and consequently their thicknes the fame, it will be found, by a similar process, that their aberrations will diminishe, as $R$ continues to exceed $r$, until $r$ is to $R$ as $1:6$; in which the construction of a lens, placed in its bell position, the aberration will be a minimum, viz. $\frac{127}{54}$ of $T$; but in its reversed or left position, the aberration will be $\frac{127}{54}$ of the fame. A single convex lens, in its bell position, has its aberration only $\frac{127}{54}$ of $T$; but with the plane side turn'd to the radiant, in which $r$ may be said to be infinite, the aberration will be $\frac{127}{54}$ of $T$. Also a double convex, when its radii $r$ and $R$ are to each other as $2:5$, has the fame aberration as a single convex in its bell position, and has less spherical aberration than any of the others; but there is no proportion of the radii of any one lens that will do away the spherical aberration altogether. If the refractive power of any glass be such, that the sines of incidence and of refraction are not exactly in the ratio $3:2$, the calculated longitudinal aberration will differ a little from the true one, so as to require a correction. And with respect to the lateral aberration, if $m$ be the sine of incidence, and $n$ the sine of refraction $= 1$, and where two lenses have equal apertures and radii, then the errors arising from obliquity of incidence will respectively be $2:5$ to $m^2$ in the other.

Likewise, we derive from the foregoing demonstrations of Dr. Smith the following general and important conclusions: first, that in lenses of equal apertures, the longitudinal aberrations, arising from figure, are inversely as the focal distances (see Cor. 2 of Prop. II. above quoted); and secondly, that under like circumstances, the lateral aberrations are inversely as the squares of the said focal distances (see Cor. 3 of the fame Prop.); and, on the contrary, that when the focal distances are the same, and the apertures differ, then the longitudinal aberrations are as the squares (see Cor. 4.), and the lateral as the cubes of those apertures. The utility of these proportions will more fully appear in the sequel.

We proceed now to the most important part of our article, viz. to shew what means have been not only devised, but practically applied, for remedying the defects arising out of these two different kinds of aberration, and for rendering the apparent object, as viewed through a refracting telescope, at the fame time distinct and colourless. Telecopes of what are called the achromatic, (from $a$, priv., and chroma, colour,) or colourless kind, are composed, like other telescopes, of two parts requiring separate consideration; viz. the object-glass and the eye-tube: the former being that which produces an image free from colours and mistiness; and the latter that which either renders this image visible, or produces a secondary one to be viewed, without the reproduction of colours. But our present consideration is of the object-glass.

Before the working optician can proceed to prepare his tools for making an achromatic object-glass, he must know the refractive and dispersive powers of his glafs. Various methods have been proposed for determining these qualities with accuracy; but it will be sufficient for our purpose to explain those which have been found most practicable. As the ratio between the sine of incidence and the sine of refraction is constant in the same glafs, though not the same ratio in different sorts of glafs, the most certain method of determining this ratio in different specimens of glafs is, to grind a piece of each of those specimens by the fame tool, as Martin and Tulley have done, and then to compare their refracted focal foci with the radius of curvature; and those which have the shortest refracted foci, will have the greatest refractive power; and the contrary. We have already explained, in the first section of our article, how this operation was conducted by Tulley in particular; and we will now state the results of his experiments in the subjoined table.

### Results of practical Experiments on the refractive Powers of different Specimens of Glasses, by C. Tulley.

<table>
<thead>
<tr>
<th>Kinds of Glasses</th>
<th>Radius of Tool</th>
<th>Focus of Refracted Rays</th>
<th>$R = 2a$</th>
<th>Ratio of the Sines of $I$ and $R.$</th>
<th>Specific Gravity</th>
<th>Ratio of Dispersive Power</th>
<th>Kinds of Glasses used together</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flint 1.</td>
<td>33.7</td>
<td>28.13</td>
<td>1.198</td>
<td>1.599 : 1</td>
<td>3.466</td>
<td>1.757 : 1</td>
<td>used with crown.</td>
</tr>
<tr>
<td>Flint 2.</td>
<td>33.7</td>
<td>29.38</td>
<td>1.147</td>
<td>1.5735 : 1</td>
<td>3.192</td>
<td>1.524 : 1</td>
<td>used with crown.</td>
</tr>
<tr>
<td>Ratcliffe crown</td>
<td>33.7</td>
<td>31.91</td>
<td>1.056</td>
<td>1.528 : 1</td>
<td>2.527</td>
<td>1 : 1.757</td>
<td>used with flint 1.</td>
</tr>
<tr>
<td>Dutch</td>
<td>33.7</td>
<td>32.12</td>
<td>1.049</td>
<td>1.524 : 1</td>
<td>2.519</td>
<td>1 : 1.524</td>
<td>used with flint 2.</td>
</tr>
<tr>
<td>Plate 1.</td>
<td>33.7</td>
<td>33.43</td>
<td>1.008</td>
<td>1.504 : 1</td>
<td>2.450</td>
<td>1 : 1.65</td>
<td>used with flint 1.</td>
</tr>
<tr>
<td>Plate 2.</td>
<td>33.7</td>
<td>33.56</td>
<td>1.004</td>
<td>1.502 : 1</td>
<td>2.428</td>
<td>1 : 1.95</td>
<td>used with flint 2.</td>
</tr>
</tbody>
</table>

If we explain how the numbers in the horizontal column of flint 1 were obtained, the rest of the table will require no further explanation. The tool on which the six specimens of glasses were ground at the same time, was of speculum metal, and did not vary its shape much during the operation of grinding and partial polishing, which was all that the glasses required for viewing the sun, and for adjustment to the focal powers. The first flint-glasses, after being thus formed to a curvature on both sides of 33.7 inches radius, equal to that of the tool, was put into a tube and made into a temporary
porary telescope, when the principal or solar focus, from actual refraction of the rays, was found to be 28.13 inches, which is therefore called the refracted solar focus, the geometrical focus derived from the radius of curvature being 33.7. This is the specimen of glafs of the greatest density as well as of the greatest refractive and dispersive powers, its specific gravity having been repeatedly ascertained to be 3.466 with different hydrostatic balances of the most delicate conduction. Now if the radiant had been at a near distance, instead of the fun being used, Martin has shewn

that the value of \( \frac{m - n}{n} \) may be had from this theorem, viz.

\[ \frac{d + df}{2 df} = a \]

where \( d, r, \) and \( f \), are as in our Table I. of Theorems, which is demonstrated in his Philosophia Britannica; and from this theorem he determined the focal distances and quantity of \( a \) of his specimens of glafs; but when the sun is used as the radiant, the distance becomes infinite; and then, neglecting \( f \) as infinitely small, the left-hand term becomes \( \frac{dr}{2df} \), and the theorem, by ejecting \( d \) from the numerator and denominator, is reduced into the form \( \frac{r}{2a} = f \), as in our Table I. for parallel rays with a double convex of equal radii. Tulley, therefore, very properly preferred taking the solar focus at once, instead of taking a measured distance for the place of the radiant, and of calculating from a long theorem, and from data that might not be perfectly correct; his results, therefore, must be considered as being more satisfactory than Martin's. The reduced theorem

\[ \frac{r}{2a} = f \]

by transposition becomes \( \frac{r}{f} = 2a \), and also \( f \times \)

\[ 2a = r \]

and therefore \( 2a \) may be either a divisor or multiplier, accordingly as \( r \) or \( f \) is given to find the other. Tulley has called this quantity a divisor, because, having the radius or geometrical focus of a glafs always, from the known radius of his grinding tool, he can get the refracted focus by the proper divisor and a simple calculation at any time; which mode, as we shall see presently, is very useful in the calculation of the compound focus of an achromatic object-glass. Now to get the actual quantity of \( 2a \) in figures, there will be 33.7 taken from the third and fourth vertical columns,

\[ \frac{28.13}{33.7} \]

which may be called \( \frac{R}{F} \) or \( \frac{r}{f} = 2a = 1.198 \) for the said divisor, one half of which is \( 0.599 = a \). Put now \( m \), as before, for the sine of incidence, and \( n \) for the sine of refraction, and we have seen above that \( \frac{m - n}{n} = a \). Let

\[ n = 1 \]

and then \( m = 1.599 \); for \( \frac{m - 1}{1} = a \), \( m = 1 + a \)

\[ = 1.599 \] and \( \frac{1.599 - 1}{1} = 0.599 = a \); therefore the sine of incidence is to the sine of refraction in this first specimen, in the ratio of 1.599:1; and in like manner the horizontal columns for all the other specimens are filled up with very little trouble, when \( \frac{R}{F} \) is ascertained by simple division of

the tabular or experimental numbers.—With respect to the vertical column of dispersive powers, these powers are best ascertained by making six equal prisms of the same specimens of glafs, and by measuring the coloured solar spectrums of each separately, under exactly the same circumstances of distance, inclination, position, &c., and as the angle of deviation is measured by the coloured spectrums as its subtense, the angles of deviation of the different specimens will vary with the respective lengths of their spectrums; and if the refracting angle of one of the specimens, the first flint for instance, be diminished by grinding and fresh polishing, until its spectrums is of precisely the same length as that of any other, say the crown, then the ratio of their refracting angles will be inversely the ratio of their dispersive powers; and a pair of analogous lenses, one convex and the other concave, (fusli as those seen in Plate XXVIII. figs. 5, and 6.) will have their dispersive powers so counteracted, that a pencil of rays incident on the thick crown-glafs will emerge from the thin flint colours left, and will proceed without colour, notwithstanding the greater refractive power of the convex lens, till, by being refracted, they finally cross the axis in which the focus is formed; and the focal point will be more or less distant with a pair of lenses so combined, accordingly as the difference of the two refracting powers is greater or smaller. To explain this analogy between a pair of prisms and a lens, either convex or concave, we will now how a pencil of solar rays passing through a prism of glafs is dispersed at the second surface, so as to form the solar spectrum composed of the prismatic colours: Let \( a, b, c, \) in fig. 9, be a triangular piece of glafs, called a prism, and \( d \) a pencil of solar light, entering the prism at \( e \), in the line \( de \), parallel to the base \( ac \); on entering the glafs it will be refracted towards this base, and emerge at the point \( f \), a little nearer to \( e \) than \( e \) is to \( a \). At this point of emergence, \( f \), the pencil will begin to disperse into rays of different colours, but whether into seven or any other number, is not our present object to enquire. Let \( A \) be a sferene, receiving the dispersed pencil in a darkened room, and \( fg \) will be the ray of mean refraction, \( fb \) will be the red ray, or ray of least refraction, and \( fi \) will be the violet ray, or ray of greatest refraction, \( bh \) being the length of the coloured spectrum. Let this prism be of crown-glafs; then substitute another of flint-glafs, exactly in the same situation, and the extreme rays, \( b \) and \( i \), will now be dispersed to \( H \) and \( I \), and the distance between those new points will be the length of the spectrum with flint-glafs. Now the angle \( gfb \) with both prisms is called the angle of deviation, or of mean refraction; the angle \( jfb \) is called the angle of dispersion with the crown, and \( jfh \) the angle with the flint prism; but these angles of dispersion are subtended by the lines \( jb \) and \( jH \) respectively, which are the lengths of their respective spectrums, which therefore are the measures of the angles of dispersion of the two different prisms. Martin found these exactly as \( 3:5 \); and therefore recommended the geometrical loci of the crown and flint glasses to be always in this proportion; but Tulley has found that this ratio will not be accurate with all specimens of flint-glafs, and therefore takes a different ratio, for each specimen of glafs that differs in this quality, from Martin's. In the same specimen of glafs, the angle of deviation always bears the same proportion to the angle of dispersion, or diffraction as it is sometimes called; and it was the opinion of Sir Isaac Newton that this is the case in all specimens; but it remained for the senior Dollond to discover, which is the basis of all achromatic constructions of an object-glafs, that the angles of deviation may be the same, when the angles of dispersion are not the same, and vice versa; and we have a striking instance in crown and flint glafs, in which, when the dispersive powers
powers are made to balance each other in opposite directions, there yet remains a balance of refractive power in favour of the crown, arising from its greater thickness, which disperses colourless rays still to deviate or be refracted, but to a more distant focus than would have been if the crown had been used alone. This effect may be seen in fig. 10, where a pair of prisms, a and b, are inscribed in the double convex lens of crown-glafls, and the pair c and e within the double concave of flint: the incident rays I, d, and I, d, at each side of the axis g e, enter the convex at the points a and c, and are refracted towards the axis, till they meet with the inverted prisms c and e of flint, when they are refracted in a contrary direction, so as to prevent their meeting at the point i of the axis to which they tended, and emerge at the points f and j colourless, in consequence of the opposite dispersions which take place in the prisms; but after encroachment they tend to a new and more distant point O in the axis, and there come to an achromatic focus.

To render this explanation still more intelligible with respect to the opposition of two counteracting dispersions, let there be two separate prisms, placed, as in fig. 11, at a distance from each other, and in vertet with respect to each other; let a b c be the prism of crown-glafls, and A B C a similar one of flint-glafls; and let two pencils of white light enter these lenses in opposite directions, one d, and the other D; then g and G will be the rays of mean refraction, h and H those of leaf, or red; and i and I those of moat, or violet. Now as the refractive power of the flint prism A B C is greater than that of the crown a b c, the mean ray G in the first will be nearer its prism, than g, the mean ray of the second, to its prism; but the angle of dispersion subtended by H I, will be greater than that subtended by h i, while the prisms have the same refracting angles C and e. Now as the refraction and dispersion in the same prism are proportionate to the refracting angle, these may be both reduced to any assignable quantity by a reduction of the refraction angle; then let the side of the prism of flint C A be ground down till it becomes C K, thereby making the angle B C A, the original refraacting angle, equal B C K, the new refraating angle; and let this second angle be to the first as the refractive power of the crown is to the refraction of the flint; or, in other words, let the refraction angles C and e be inversely as the refractive powers of the two specimens of glafs formed into prisms: viz. as that of g f F : G f F, and then the mean ray G will be extended to c, and F will be parallel to f C; that is, the mean refraction of the two lenses will be alike, the angle G F / = L g F, by being alternate. In this situation of the refraacting angles of the opposite prisms, the rays would both enter and emerge parallel as to refraction; but as to dispersion, that of the flint would still predominate a little, or the angle H F I would in some measure exceed the angle h i j; but these are the angles we want to have equal; therefore, to make the refraacting angles C and e of the two prisms proportional to the different powers, or to the fpectra h i and H I in fig. 9, let the side B C also of the flint prism be ground down a little to l, so that the refraating angle l C k of this flint, shall be to the refraating angle a e b of the crown in this ratio of the fpectra; and then not only will the difpersive powers of the two prisms become equal, but, what is equally necessary, G will now fall beyond c, that is, the refractive power of the flint by this second diminution of its refraating angle, will become less than the refractive power of the crown, and the difference of these powers will refract the transmitted rays, as in fig. 10, finally to the distant point O, as has been explained, while at the same time the rays that arrive there will be without colours. If now we conceive that the refraating angle of each of the flint prisms e and c, in fig. 10, inscribed within the concave lens e c, is so proportioned to the refraating angle of the prisms a and b, inscribed in the convex lens of crown a b, as the refraating angle l C k of the flint prism in fig. 11, is to the refraating angle a e b of the crown prism, then the double object-glafls in fig. 10 will be achromatic; its lenses being analogous to the correcting prisms. Thus the theory of a double achromatic object-glafls is within the comprehension of our ordinary readers; and as the triple object-glafls has two thin convex lenses of crown, instead of one thick, to combine with the flint concave one, a further explanation is unnecessary, particularly if the thick double convex be supposed to be divided longitudinally into two plano-convexes, and to be placed one on each side of the concave: for when these plano-convexes are formed into two curves, giving the same focal distance as each of one of the plano-convexes, then the union of the three lenses will be that represented in fig. 7.

We may now proceed to exemplify this theory, arising out of Dollond's grand discovery; and to make the construction as familiar as possible, we will avoid all fluxional calculations, and explain such algebraical ones only, as are indispenfable, in the first example at full length, as they occur, so that the abridgments in the subfquent examples may be clearly intelligible. Our aim differs from that of our predecessors in this respect. The illustrious mathematicians Euler, d'Alembert, Clairaut, Boscovich, Klugel, and Robison, have given formulae for the calculation of achromatic object-glafls, that are above the comprehension of ordinary opticians; and Dr. Brewster has calculated tables, according to these formulz, of the different curves that suit a certain specimen only of flint-glafls, and that such as is not to be found, at least in England; viz. that which has its fuses of the L of incidence and of the L of refraction as 7.691.4. Besides, the calculations tabulated are not in a practical form in Table II., the radius of the convex being shorter than that of its contiguous concave. On the contrary, we propose to take glafs that falls in our way, and to calculate in a familiar manner the radii of curvature that shall suit specimens already within our reach. In short, our predecessors shew how achromatic object-glafls may be made, if proper glafs could be obtained; and we will explain how achromatic object-glafls are made, and in the best manner, with glafs of our own manufacture.

Example 1.—Let it be required to form a double object-glafls of thirty inches focal length, from the second flint-glafls and crown-glafls given in Tulley's table of experimental results? In the crown-glafls, the ratio of the fuses of the angles of incidence and of refraction (m : n) is 1.528 : 1; and in the flint-glafls it is 1.575 : 1; while the ratio of their difpersive powers are 1500:1762, or 1:1.524. The first step is to determine the ratio of the geometrical focus of the flint or crown-glafls, to the compound focus of the proposed pair of glafs, in order that the radius of this lens may be known, before its proper companion, the flint lens, has its focus determined. It will be convenient to call the radius of the convex 1, and as it is proposed to have it a double convex, the geometrical focus will also be 1; but as the compound focus of both lenses in the reftacted focus always, the geometrical focus must be turned into the reftacted focus also, in order to have both of the fame denomination: but to do this we want the divisor, which may be taken from the table, or derived from

\[ \frac{m - n}{n} \times \frac{1.528 - 1.000}{1.000} = \frac{1.528 \times 2}{1.056} = 1.158, \]

\[ \frac{1}{1.158} \]

\[ \frac{1}{158} \]

Vol. XXXV.
TELESCOPE.

divisor of the crown; and $\frac{1.5735 - 1.000}{1.000} = 0.5735 \times 2 = 1.147$, the divisor of the flint. In the next place we have $\frac{1.000}{0.956} = 1.047 \times 2 = 2.094$ for the refracted focus of the crown lens;

and because the foci of the crown and flint lenses must be in the same ratio as their dispersive powers, which we have

flated to be 1 : 1.524, we shall have $\frac{1.5735 - 1.000}{1.000} = 0.5735 \times 2 = 1.147$ for the refracted focus of the concave or flint-glass. Now, having

$1.047 \times 2 = 2.094$ as the ratio of the two separate refracted focal distances that shall banish all colours by their equal and opposite dispersive powers; we next find what will be the compound focus corresponding to these two when put in contact. Let $F$ be the focus of the convex, and $F'$ that of the concave; and by our practical theorem 5, there

will be $\frac{F \times F'}{F - F'} = \frac{1.047 \times 2}{2} = 1.147$, the

proportional compound focus required. Now if the prismatic aberration were the only one necessary to be counteracted, we have already obtained numbers that would enable us to construct an achromatic or colourless compound object-glass; for

if we multiply $F$, $F'$, and $f$ alike by $\frac{30}{3.29}$, or 9.12, the

gnomical focus of the convex lens, we should have the absolute refracted focus of $F = 0.9697 \times 9.12 = 8.636$; that of $F' = 1.3827 \times 9.12 = 12.611$, and the compound focus $= 3.29 \times 9.12 = 30$ very nearly; and it would be immaterial what the curves were, provided the refracted focal distances of $F$ and $F'$ were as above flated: but as the tools for forming the curves respectively for the fides of these lenses, must have regard to the radius of curvature, it would be now necessary to use the divisors as multipliers, to convert the refracted into the geometrical foci, and then the

numinals might be put in hand. On this supposition of there being only one kind of aberration, the construction of a compound achromatic object-glass would be no difficult affair; for while the focal distances only are required to be to each other in a given ratio, the radii of curvature might be varied almost at pleasure, without affecting the focal distance. But there yet remains the spherical aberrations of the two separate lenses to oppose to each other in such proportion, their tendency to produce

indiscernibleness may be completely obliterated. Before the time of Sir Isaac Newton, this was the only kind of aberration that opticians thought they had to contend with; and though it is small in quantity, compared to the prismatic aberration, yet it is more difficult to conquer. It is, however, contrary to the opinion of that great philosopher and mathematician, in the power of the modern opticin to cure this defect of spherical glasses, by means equally simple, when determined, as those by which the prismatic colours are made very nearly to vanish. As in the annihilation of the prismatic colours, the ratio of the focal distances, made directly as the ratio of the dispersive powers, is a cure for the first imperfectio; so the ratio of the radius $r$ of the two lenses, to be calculated as to counteract each other's spherical aberrations, is the cure for the second imperfectio; and this cure we have yet to apply, without interfering with the remedy which we have yet prescribed for the other. In order to mark the distinction that must be made in the symbols, as applied respectively to the convex and concave lenses, let it be understood, that the subjoined notation will be attended to in our investigation of the curves proper for our present purpose; viz.

Convex. Concave.

$R \cdot R$ means the radius of the first surface. $F \cdot F$ means the radius of the second surface. $f \cdot f$ means the focus from solar rays, or geometrical, if so expressed. $T \cdot T$ the thickness of the lens. $A \cdot A$ the spherical aberration. $m \cdot m$ the line of incidence. $n \cdot n$ the line of refraction. $\phi$ the compound focus.

It may be also necessary to premise, that whatever ratio of the radii $r$ and $R$ be fixed upon for the convex lens, the ratio $r : R$ of the concave may always be found by proper investigation such, that its aberration will counteract that of $r : R$; but the reverse is not true; the aberration of $r : R$ may be too great for the aberration of any ratio $r : R$ to equal; therefore the ratio $r : R$ is first assumed, as is most convenient for the optician's tools already formed; and $r : R$ must be so calculated, that its aberration shall be in due proportion for correcting the aberration of the assumed convex lens. We now have to do with the geometrical foci of both lenses, when their radii become the subject of investigation; and we have seen that $9.12 \left(\frac{30}{3.29}\right)$ is the geometrical focus of the convex lens, therefore $1.574 \times 9.12 = 13.9$ is the geometrical focus of the concave, their ratio being still as their dispersive powers, very nearly. Let us now assume $r = 7.5$, or any other quantity at option, and fee by the proper theorem what $R$ will be, to have a focus of 9.12 inches: to do this we have, by

No. 1. of our practical theorems, before given, $r F \cdot R$,

or, in figures, $7.5 \times 9.12 = R = 11.63$; hence $r : R = 7.5 : 11.63$, or as 1 to 1.55. In the next place, we must determine what is the longitudinal aberration arising from the figure of a lens, where the ratio $r : R$ is 1 to 1.55, which is most conveniently done by the general theorem of Huygens, which we have before exemplified, and which

stands thus; $\frac{2T^2 + 6rR + 7R^2}{6 \times r + R^2} \times T = A = 1.564 \times T$.

viz. $\frac{27^2 + 6 \cdot 7.5 \cdot 9.3 + 7 \cdot 9.3^2}{6 \times 7.5 + 9.3^2} \times 93.6 = 6.025$; multiplied by 6

value of no-

\[
\begin{array}{c}
\text{erator} \\
\text{eminent} \\
\text{minator}
\end{array}
\]

\[
\{ 53.1175 \} = 30.015
\]

Then $\frac{53.1175}{30.015} = 1.764 \times T = A$.

Having now found $1.361 \times T = A$ of the convex lens, the value of $T$, which is the sum of the vered foci of the two intercrossing curves of its surfaces, may be calculated by the square root, or by plane trigonometry, and will be found $= .252$, when the semi-diameter of the lens is 1.5, consequently $1.361 \times .252 = .345$, is the absolute quantity of the spherical aberration of the convex lens; but $\phi$ of the concave
conce is by calculation $1653$, and $\frac{3429}{1653} = 2.074$ is its proportional aberration. But as the thickness, breadth, and geometrical focal length of every lens, of whatever form, must, from the properties of the circle, be in proportion to each other (see Martin's New Sytem, art. 705.), $\frac{T}{r}$ may be taken at once, instead of using $T$ and $r$ together with calculated values (which require some operations), and then the work will be greatly facilitated; thus $1.361 \times T \times 1.524 = 2.074 \times T = \frac{1}{A}$. Now, as this quantity 2.074 bears the same proportion to 1.361, as the focus of the concave does to the focus of the convex, it might be concluded that this would be the proper aberration to correct the aberration 1.361 of the convex lens; but this is not the case, for, first, the longitudinal aberrations arising from the figure are not in the same proportion to the focus of the lenses respectively, neither is the quantity the same with the lens with the crown glasses. Martin affords that the spherical longitudinal aberrations are to each other, in like lenses of different focal lengths, inversely as the squares of the foci respectively; consequently, in our example, these aberrations would be inversely as $F^2:1/F^2$; or as $13.9 \times 13.9:9.12 \times 9.12$.

that is, as 193.21 : 83.174, or as $\left\{ \begin{array}{l} A \\ 1.361 \end{array} \right\} \frac{1}{A}$; but when Tulley took $0.585 = \frac{1}{A}$, this aberration was found much too small; for when he had ground the lenses with curves to produce this aberration, he found that the eye-tube required to be drawn outwards more than towards the lense, from the true focal point, before the image appeared, which is a proof that the concave had less than its share of aberration; it being considered as a told of good correction, when the image disappears at points of the tube equally distant from the point of distinct vision, accordingly as the tube is pushed in or drawn out from its focal point. And here was probably the difficulty that Martin experienced between his theory and practice. Neither was the aberration thus obtained by due proportion, when corrected by the simple ratio of the two divisors $2:2:a$, or $1.056:1.147$, for the difference of the refractive powers; for as 1.147:1.056:1.161:1.253; but 1.253 $\times T = \frac{1}{A}$ was still too little for due correction. Though the telescope was schromatic by virtue of the ratio of the foci of the crown and flint lenses, yet there was a want of perfect distinction, owing to the deficiency of aberration attaching to the concave lens. After a multiplicity of investigations, calculations, and practical trials, Tulley at length discovered a method of balancing the opposite aberrations, which he has continued to practice with success for years, and which is therefore no new project. The method is this: the value of $\frac{1}{A}$ ($2.074 \times T$) being first determined from $A$, in the ratio of $F:1/F$, as above explained, the correcting number is thus obtained; if we call the square root of the cube of the refracted focus of the convex $= x$, the geometrical focus being taken $= 1$; and put also $y$ for the square root of the cube of the refracted focus of the concave, when its geometrical focus is $= 1$; then $\frac{F}{x} = z$ is the correcting number, by which the proportional aberration, before determined, must be divided, to gain the proper or corrected aberration, now expressed by the symbols $\frac{1}{A}$.

In the inistance before us, the calculation will be $0.947 = 0.8492781$, and its square root $= 0.2914 = x$; and $\sqrt{0.872} = 0.2575 = y$; then $\frac{2.074}{0.883} = 2.348 = \frac{1}{A}$ corrected.

Having now ascertained the aberration $2.348 \times T$ of the concave lens, that will balance the aberration $1.361 \times T$ of the convex, we must proceed to determine the ratio $r':R$ of the concave, that shall have exactly this aberration: to be able to do this without a table of aberration, requires an acquaintance with quadratic equations; for the proportion of the radii $r$ and $R$ must be investigated from the corrected aberration which we have now ascertained.

1st. We have $27r^2 + 6rR + 7R^2 = 6 \times r + R^2$ $= T = A$ (by the general theorem) $= 2.348 \times T$, as before found; but we make no distinction between $r, R, A, \frac{1}{A}, T, \frac{1}{T}, \frac{1}{A}$, that we may simplify the symbols: this equation, by evolution of $r + R^2$ in the denominator, becomes $27r^2 + 6rR + 7R^2 = \frac{T}{r + 2rR + R^2} = 2.348 \times T$; now putting $R = 1$, there will be $27r^2 + 6r + 7$. Now $\frac{T}{r + 2r + 1} = 2.348 \times T$; or, dividing both sides by $\frac{T}{6}$, $6 \times 2.348 = 14.088$, or $14.1 = 27r^2 + 6r + 7$; and multiplying both by the denominator, $14.1r^2 + 28.2r + 14.1 = 27r^2 + 6r + 7$; then subtracting equal quantities from both, there remains $22.2r + 7.1 = 12.9$; and by transposition, $12.9r - 22.2 = 7.1$ of the quadratic. Now to find the root, we have first $r^2 = 7.1 - \frac{7.1}{12.9} = 12.9$; and adding the square of the half co-efficient, $r^2 = 7.1 - \frac{7.1}{12.9} = 12.9$; and therefore the root $r = \frac{7.1}{12.9} = \sqrt{\frac{7.1}{12.9}} + \frac{11.1}{12.9}$ and $r = \sqrt{\frac{7.1}{12.9}} + \frac{11.1}{12.9} + \frac{7.1}{12.9}$ of the quadratic.

Lastly; to collect the aggregate of the values of $r$, we have $\frac{7}{12.9} = 0.55 + \frac{11.1}{12.9} = \frac{7.4}{12.9}$; and $\sqrt{0.55 + 0.74} = \sqrt{1.29} = 1.135$; likewise $\frac{11.1}{12.9} = 0.860$; therefore $1.135 + 0.860 = 1.995 = r$, which was desired; and the ratio $r = \frac{R}{R}$, which we now put again $r':R = 1.995 : 1$; and which in Tulley's Table stands $2:1$. After having thus determined the ratio of the radii $r$ and $R$ to be $2:1$ very nearly, we must now find the rational geometrical focal distance of this concave by the fourth of our practical theorems above exemplified; viz.: from $\frac{2rR}{r + R}$, we first have $\frac{2 \times 2 \times 1}{1 + 2} = 1.333$; and as the geometrical focus is known to be $13.9$, we have also $\frac{13.9}{1.333} = 10.428 = \frac{1}{R}$, and $10.428 \times 2$
x = \frac{r}{1}; \text{ so that the four radii of the faces and the corresponding foci will stand thus; viz.}

r = 7.50 \quad \text{and } F = 9.12, \text{ the geometrical focus of the convex lens.}

\frac{r}{1} = 10.428 \quad \text{and } \frac{F}{1} = 13.9, \text{ the geometrical focus of the concave lens.}

\phi = 30.04 \quad \text{the compound refracted focus of the telescope, according to the proper theorem.}

We have now brought the calculations of our first example to a conclusion, accompanied by such explanations as may render it unnecessary to dwell too minutely on the following examples; and when we have gained these radii for a telescope of 30 inches focus, we have the means of making a telescope equally achromatic and distinct of any other length; for the ratios \( r : R \) and \( \frac{r}{1} : \frac{R}{1} \), being once determined for crown and flint glasses of given refractive and dispersive powers, require only to be increased in equal quantities to suit the foci of the proposed telescopes, as in the subjoined table; and it may be proper to notice, that though the specific gravity has not been taken into the account in the calculations of this example, yet it is useful as an index to point out the ratio of the lines of incidence and of refraction, and of the dispersive powers to be used, when the specimens of glasses are selected by their specific gravities only, without an experimental trial by grinding.

The subjoined table is suitable for achromatic double object-glasses of various lengths; where \( m : n \) in the crown-glasses is as 1.528 : 1, and in the flint as 1.5735 : 1; their dispersive powers being 1 : 1.524.

### Table I. Radii of double Object-glasses in Inches.

<table>
<thead>
<tr>
<th>( \phi )</th>
<th>( r )</th>
<th>( R )</th>
<th>( \frac{r}{1} )</th>
<th>( \frac{F}{1} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>1.50</td>
<td>2.326</td>
<td>2.086</td>
<td>4.171</td>
</tr>
<tr>
<td>12</td>
<td>3.00</td>
<td>4.652</td>
<td>4.171</td>
<td>8.342</td>
</tr>
<tr>
<td>18</td>
<td>4.50</td>
<td>6.978</td>
<td>6.256</td>
<td>12.513</td>
</tr>
<tr>
<td>24</td>
<td>6.00</td>
<td>9.304</td>
<td>8.342</td>
<td>16.684</td>
</tr>
<tr>
<td>30</td>
<td>7.50</td>
<td>11.630</td>
<td>10.428</td>
<td>20.856</td>
</tr>
<tr>
<td>36</td>
<td>9.00</td>
<td>13.956</td>
<td>12.512</td>
<td>25.027</td>
</tr>
<tr>
<td>42</td>
<td>10.50</td>
<td>16.282</td>
<td>14.598</td>
<td>29.198</td>
</tr>
<tr>
<td>48</td>
<td>12.00</td>
<td>18.608</td>
<td>16.684</td>
<td>33.369</td>
</tr>
<tr>
<td>54</td>
<td>13.50</td>
<td>20.934</td>
<td>18.770</td>
<td>37.540</td>
</tr>
<tr>
<td>60</td>
<td>15.00</td>
<td>23.260</td>
<td>20.856</td>
<td>41.712</td>
</tr>
<tr>
<td>72</td>
<td>18.00</td>
<td>27.012</td>
<td>25.025</td>
<td>50.054</td>
</tr>
<tr>
<td>84</td>
<td>21.00</td>
<td>32.554</td>
<td>29.196</td>
<td>58.396</td>
</tr>
<tr>
<td>96</td>
<td>24.00</td>
<td>37.216</td>
<td>33.368</td>
<td>66.738</td>
</tr>
<tr>
<td>108</td>
<td>27.00</td>
<td>41.868</td>
<td>37.540</td>
<td>75.080</td>
</tr>
<tr>
<td>120</td>
<td>30.00</td>
<td>46.52</td>
<td>41.712</td>
<td>83.424</td>
</tr>
</tbody>
</table>

In this table, \( R \) and \( \frac{R}{1} \) are the faces of the two lenses which come in contact, and \( r \) and \( \frac{r}{1} \) the external faces; and it will be seen that \( R \), being a little longer than \( \frac{R}{1} \), the convex face, will approach the concave one very closely, but will not touch it, which is a necessary practical condition. When the aberration exceeds 1.666, which is that of \( r : R \) when they are each \( 1 \), or alike; then \( r \) exceeds \( R \), and the lens must be reversed, or put in its worst position; which is the case in all our tables for double object-glasses with the flint-glasses; otherwise the concave would not have had sufficient aberration for the convex.

In our next example it will not be necessary to do the work at full length, but only to give such an abridgment as will be intelligible to the reader who understands the process minutely explained in the preceding example. The density of different sorts of crown-glasses seldom varies; but two specimens of flint can seldom be found to be alike. The greater the density of flint-glasses, the more suitable it is for the purpose of making a concave lens of an achromatic object-glass, because the radii of both the lenses may be longer for the same compound refracted focus; and, consequently, the spherical aberration will be less than in glases that requires shorter radii to produce the same compound focus. In the form of the concave had been given, the convex would have been determined by a reversed operation, where the multiplier 1.524 would have been a divisor, and \( \frac{z}{a} \) a multiplier, &c.

**Example 2.**—Let it be required to form a double object-glasses of 30 inches focal length, as before, with the same crown-glasses for the convex, but with the densest flint, in which the ratio \( m : n \) is as 1.599 : 1, and their dispersive powers \( 1 : 1.757 \)?

In this example we have \( 1.056 = 2 \sigma \), or the divisor for the crown, as before, and \( 1.599 - 1 \times 2 = 1.198 = 2 \alpha \), or divisor for the flint; then

\[
\frac{1}{1.056} \cdot 0.94697 = F \text{ refracted, and}
\]

\[
1.757 = 1.466 = F, \text{ also refracted, and also } \frac{F \times \frac{F}{1}}{1.198} = 2.67, \text{ the ratio of the compound focal length, or what we called the rational compound focus; consequently, the ratio between } F \text{ geometrical and the compound focus is in this example } 2.67; \text{ and the ratio between the refracted foci of the separate lenses, to correct the coloric rays, is } \left\{ \frac{F}{1.94697} : 1.466 \right\}.
\]

With respect to the spherical aberrations, which are next to be considered, we may in the first place determine the quantities \( x \) and \( y \), and \( z \), the correcting divisor, which is derived from them, thus;

\[
\left\{ \sqrt{0.94697^2 - 0.2914 = z} \right\}; \text{ and as } \frac{1}{1.198} = 0.834, \text{ &c.}
\]

gives the refracted focus of the flint or concave lens, \( (F \text{ geometrical being } 1 \text{ in this case}) \); \sqrt{0.834^2 = 2.408 = y}; \text{ and}

\[
y = \frac{2.408}{1.2914} = z = 0.826, \text{ the correcting divisor required for this refractive power of the flint-glasses. In the next place,}
\]

\[
\frac{1}{2.67} = 11.23 = F \text{ (geometrical), and } 11.23 \times 1.757 = 19.73 = F \text{ (geometrical also). Let us here assume } r = 9 \text{ inches, and then by the theorem } \frac{r}{2} - F = R, \text{ we get}
\]

\[
R = 14.92, \text{ and consequently the ratio } r : R \text{ will be } 9 : 14.92, \text{ or } 1 : 1.66 \text{ in its lowest terms. A double convex lens}
\]
TELESCOPE.

lens ground with its radii in this ratio, will have its spherical aberration \( = 1.325 \times T \); to counteract which, the concave must have its proper aberration determined; and then the ratio of its radii must be investigated, that shall make a lens with this determined quantity of aberration. We have seen already that \( A = 1.325 \times T \), therefore \( 1.325 \times 1.757 = 2.328 \times T \), the proportional aberration for \( F \), considered as having the same refractive power as \( F \); but the correcting divisor must now be applied, and \( 1/A = \frac{2.328}{.826} = 2.818 \) is the corrected aberration, for which the radii \( r \) and \( R \) are now to be investigated. By putting \( R = 1 \), as before, and by working out the root of the quadratic arising from

\[
\frac{27r^2 + 6r + R^2 + 27r^2 - 2rR + R^2}{6 \times r + R} \times T = 2.818,
\]

we shall have the ratio \( 1/R : r = 1: 3.075 \). And, lastly, for the actual radii of the concave, we get, by our practical theorem

\[
\frac{2rR}{r + R} = F, \quad 2 \times 1 \times 3.075 = 1.51 = F \text{ rational, and } 19.73 = 1.51 \times 1.056 = 1.306 = R; \text{ as also } 1.306 \times 3.075 = 40.15 = tr, \text{ the second side of the concave. Hence we now have}
\]

\[
\begin{align*}
\frac{r}{R} &= \frac{9.00}{14.92} \\
\frac{R}{R'} &= \frac{14.92}{13.06} \\
\frac{1}{r'} &= \frac{1}{3.075}
\end{align*}
\]

And \( R = 19.73 \) geometrical. \( r = 13.06 \) and if \( F = 19.73 \) geometrical. \( \Phi = 29.81 \) according to the proper theorem.

It may be satisfactory to prove, that the geometrical quantities \( F \) and \( F' \) which we have here determined, will make \( \Phi \), the compound focus of the telescope, \( = 30 \) inches. But it will be requisite first to turn the geometrical foci \( F \) and \( F' \) into the refracted foci, their respective divisors, denominated \( 2a \) and \( 2a' \) \( \text{viz.} \ 1.056 \quad \text{and} \quad 1.198 \); thus, \( 1.056 \quad \text{is} \quad 10.634 = F \text{ refracted, and } 19.73 = 16.479 = F' \text{ refracted}; \) then by our theorem \( \frac{F \times F'}{F - F} = \phi \), we have

\[
\frac{10.634 \times 16.479}{16.479 - 10.634} = \frac{175.237686}{5.845} = 29.81 = \phi; \text{ and if the decimal had been carried farther in the geometrical foci, the compound focus would have been quite } 30, \text{ as required. It may be for the benefit of practical men to subjoin a table similar to our preceding one, derived from the radii of curvature determined in this second example. And let it be understood by our readers, that in all our tables for the radii of curvature, the length of the telescope in inches is denoted by the figures in the first vertical column; and that the numbers in the same horizontal column with any given length, shew the proper geometrical radii of curvature for convex and concave lenses to confine such telescope. The following table is suitable for double achromatic objective-glasses of various focal lengths, where \( m : n \) in the crown-glass is as \( 1.528 : 1 \); and in the flint as \( 1.599 : 1 \); and their dispersive powers as \( 1 : 1.757 \).
\]

<table>
<thead>
<tr>
<th>( \phi )</th>
<th>( r )</th>
<th>( R )</th>
<th>( 'R' )</th>
<th>( 'r' )</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>1.80</td>
<td>2.98</td>
<td>2.61</td>
<td>8.03</td>
</tr>
<tr>
<td>12</td>
<td>3.60</td>
<td>5.97</td>
<td>5.22</td>
<td>16.06</td>
</tr>
<tr>
<td>18</td>
<td>5.40</td>
<td>8.95</td>
<td>7.83</td>
<td>24.09</td>
</tr>
<tr>
<td>24</td>
<td>7.20</td>
<td>11.93</td>
<td>10.44</td>
<td>32.12</td>
</tr>
<tr>
<td>36</td>
<td>9.00</td>
<td>14.92</td>
<td>13.06</td>
<td>40.15</td>
</tr>
<tr>
<td>42</td>
<td>12.60</td>
<td>20.89</td>
<td>18.28</td>
<td>56.21</td>
</tr>
<tr>
<td>48</td>
<td>14.40</td>
<td>23.87</td>
<td>20.89</td>
<td>64.24</td>
</tr>
<tr>
<td>54</td>
<td>16.20</td>
<td>26.85</td>
<td>23.49</td>
<td>72.27</td>
</tr>
<tr>
<td>60</td>
<td>18.00</td>
<td>29.84</td>
<td>26.12</td>
<td>80.30</td>
</tr>
<tr>
<td>72</td>
<td>21.60</td>
<td>35.82</td>
<td>31.34</td>
<td>96.36</td>
</tr>
<tr>
<td>84</td>
<td>25.20</td>
<td>41.78</td>
<td>36.56</td>
<td>112.42</td>
</tr>
<tr>
<td>96</td>
<td>28.80</td>
<td>47.75</td>
<td>41.76</td>
<td>128.48</td>
</tr>
<tr>
<td>108</td>
<td>32.40</td>
<td>53.71</td>
<td>46.98</td>
<td>144.54</td>
</tr>
<tr>
<td>120</td>
<td>36.00</td>
<td>59.68</td>
<td>52.24</td>
<td>160.60</td>
</tr>
</tbody>
</table>

Example 3.—We shall now take the same crown-glasses, with a flint-glass between the two extremes, which we have used, \( \text{viz.} \) in which \( m : n \) is as \( 1.584 : 1 \), and their dispersive powers as \( 1: 1.591 \); and let it be required to calculate a double achromatic object-glass of 30 inches focal length, as before?

Having already the divisor \( 2a \) of the crown equal \( 1.056 \), we begin with getting that of the flint thus, \( 1.584 - 1 \times 2 = 1.168 = z' \), or proper divisor; then

\[
\frac{1}{1.056} = .9469 = F \text{ refracted, as before; and } \frac{1.59}{1.168} = 1.3613 = F' \text{ refracted. Also } \frac{F \times F'}{F - F} = 3.111, \text{ the rational compound focus; and } 1: 3.111 \text{ is the ratio between } F \text{ geometrical and } \Phi. \text{ We have } x = \frac{2914}{1.056} \text{ from our former examples, and to get } y, \text{ we have } \frac{1}{1.168} = .856 \text{ as } F \text{ refracted, when } F \text{ geometrical is } 1; \text{ therefore } \sqrt[\Phi]{.856} = .2512 = y; \text{ but } \frac{y}{x} = z; \text{ hence } \frac{2512}{.2914} = .862 = z, \text{ the correcting divisor. Again } \frac{30}{3.111} = 9.643 = F \text{ geometrical, and } 9.64 \times 1.59 = 15.327 = F' \text{ in the same denomination. In this example we will take } r = 8 \text{ inches; then, by the proper theorem } \frac{r_F}{2r - F} = R, \text{ we have }
\]

\[
\frac{8 \times 9.64}{2 \times 8 - 9.64} = 12.12 = F, \text{ and } \frac{12.12}{9.64} = 1.515 \text{; consequently the geometrical ratio } r : R = 1: 1.515. \text{ Also, from}
\]
from the general theorem of Huygens, we find \( A = 1.374 \times T \), and \( 1.374 \times 1.59 = 2.183 \times T = A \) rational, which is yet to be corrected; then

\[
\frac{2.184}{1.862} = 2.535, \text{ the corrected aberration.}
\]

By getting the root of the quadratic arising from this aberration agreeably to the general theorem, as before, the ratio of the radii \( \frac{R}{r} \) comes out \( 1:2.375 \).

Lastly, by the theorem

\[
\frac{2rR}{r+R} = \frac{2}{A}
\]

we get

\[
\frac{2 \times 1 \times 2.375}{1 \times 2.375} = 1.407 = \frac{F}{F} \text{ rational, and } \frac{1.327}{1.407} = 0.89 = \frac{r}{R}, \text{ and also } 10.89 \times 2.375 = 25.864 = \frac{r}{R}.
\]

We have, therefore,

\[
r = 8.00, \quad \frac{R}{r} = 12.12, \quad \frac{F}{r} = 9.643.
\]

Hence the next table is suitable for double achromatic object-glasses of various focal lengths, where \( m:n \) in the crown-glass is as 1.528 : 1, and in the flint as 1.584 : 1; and their respective dispersive powers as 1 : 1.590.

### Table III.—Radii of double Object-glasses in Inches.

<table>
<thead>
<tr>
<th>( \phi )</th>
<th>( r )</th>
<th>( R )</th>
<th>( \frac{R}{r} )</th>
<th>( \frac{r}{R} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>1.60</td>
<td>2.42</td>
<td>2.18</td>
<td>$\frac{r}{R} = 8$</td>
</tr>
<tr>
<td>12</td>
<td>3.20</td>
<td>4.84</td>
<td>4.36</td>
<td>10.34</td>
</tr>
<tr>
<td>18</td>
<td>4.80</td>
<td>7.27</td>
<td>6.53</td>
<td>15.52</td>
</tr>
<tr>
<td>24</td>
<td>6.40</td>
<td>9.69</td>
<td>8.71</td>
<td>20.69</td>
</tr>
<tr>
<td>30</td>
<td>8.00</td>
<td>12.12</td>
<td>10.89</td>
<td>25.86</td>
</tr>
<tr>
<td>36</td>
<td>9.60</td>
<td>14.54</td>
<td>13.06</td>
<td>31.03</td>
</tr>
<tr>
<td>42</td>
<td>11.20</td>
<td>16.97</td>
<td>15.24</td>
<td>36.20</td>
</tr>
<tr>
<td>48</td>
<td>12.80</td>
<td>19.38</td>
<td>17.42</td>
<td>41.38</td>
</tr>
<tr>
<td>54</td>
<td>14.40</td>
<td>21.81</td>
<td>19.60</td>
<td>46.55</td>
</tr>
<tr>
<td>60</td>
<td>16.00</td>
<td>24.24</td>
<td>21.78</td>
<td>51.72</td>
</tr>
<tr>
<td>72</td>
<td>19.20</td>
<td>29.08</td>
<td>26.14</td>
<td>62.06</td>
</tr>
<tr>
<td>84</td>
<td>22.40</td>
<td>33.93</td>
<td>30.49</td>
<td>72.40</td>
</tr>
<tr>
<td>96</td>
<td>25.60</td>
<td>38.77</td>
<td>34.85</td>
<td>82.75</td>
</tr>
<tr>
<td>108</td>
<td>28.80</td>
<td>43.63</td>
<td>39.20</td>
<td>93.10</td>
</tr>
<tr>
<td>120</td>
<td>32.00</td>
<td>48.48</td>
<td>43.56</td>
<td>103.44</td>
</tr>
</tbody>
</table>

### Example 4.—Let us next take an example, in which plate-glass is substituted for crown, and let the签 of the angles of incidence and of refraction in it be as 1.524 : 1, while \( m:n \) in the flint is as 1.573 : 1, and their dispersive powers 1 : 1.623; and let the length of the telecope be required to be 30 inches, as before? Then

\[
\frac{m-n}{n} \times 2 = 2a = 1.008, \text{ is the divisor for the plate-glass; and}
\]

\[
\frac{1}{1.008} = .992 = F \text{ refracted; and } \frac{1.623}{1.147} = 1.415 = F \text{ refracted.}
\]

Again, \( \frac{F \times F}{F-F} = 3.318 = \phi \text{ rational; and also } \sqrt[3]{.9923} = x = .3124, \text{ and } \left(\frac{1}{1.147}\right) = .872 \). \[ .872 \]

\[
= y = .2575, \text{ whence } \frac{y}{x} = \frac{.2575}{.3124}. \text{ Like-wise } \frac{30}{3.318} = 9.03 = F, \text{ and } 9.03 \times 1.623 = 14.65 = F.
\]

Put \( r = 7.5 \); then \( \frac{rF}{2r-F} = R = 11.34, \text{ and } \frac{R}{r} = 1.51, \text{ or } r:R = 1:1.51; \text{ hence } A, \text{ by the general theorem of Huygens, } 1.376 \\times T, \text{ and } A = 1.376 \times 1.623 = 2.333 \times T = \text{ the aberration of the concave corrected for the difference of refractive power. The root arising from a quadratic equation of this aberration is } \frac{r}{R}. \text{ When } \frac{r}{R} = 1, \text{ consequently } \frac{2rR}{r+R} = 1.471 = \frac{F}{r}, \text{ and } 14.65 = 9.96 = \frac{F}{r} \text{ geometrical; also } 9.96 \times 2.78 = 27.68 = \frac{F}{r} \text{ geometrical.}
\]

### Table IV.—Radii of double Object-glasses, with Lenses of Plate and Flint, in Inches.

<table>
<thead>
<tr>
<th>( \phi )</th>
<th>( r )</th>
<th>( R )</th>
<th>( \frac{R}{r} )</th>
<th>( \frac{r}{R} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>1.50</td>
<td>2.27</td>
<td>1.99</td>
<td>5.54</td>
</tr>
<tr>
<td>12</td>
<td>3.00</td>
<td>4.54</td>
<td>3.98</td>
<td>11.07</td>
</tr>
<tr>
<td>18</td>
<td>4.50</td>
<td>6.81</td>
<td>5.97</td>
<td>16.61</td>
</tr>
<tr>
<td>24</td>
<td>6.00</td>
<td>9.08</td>
<td>7.96</td>
<td>22.15</td>
</tr>
<tr>
<td>30</td>
<td>7.50</td>
<td>11.34</td>
<td>9.96</td>
<td>27.68</td>
</tr>
<tr>
<td>36</td>
<td>9.00</td>
<td>13.61</td>
<td>11.95</td>
<td>33.22</td>
</tr>
<tr>
<td>42</td>
<td>10.50</td>
<td>15.88</td>
<td>13.94</td>
<td>38.76</td>
</tr>
<tr>
<td>48</td>
<td>12.00</td>
<td>18.15</td>
<td>15.93</td>
<td>44.20</td>
</tr>
<tr>
<td>54</td>
<td>13.50</td>
<td>20.42</td>
<td>17.92</td>
<td>49.83</td>
</tr>
<tr>
<td>60</td>
<td>15.00</td>
<td>22.68</td>
<td>19.92</td>
<td>55.36</td>
</tr>
<tr>
<td>72</td>
<td>18.00</td>
<td>27.22</td>
<td>23.90</td>
<td>66.44</td>
</tr>
<tr>
<td>84</td>
<td>21.00</td>
<td>31.76</td>
<td>27.88</td>
<td>77.51</td>
</tr>
<tr>
<td>96</td>
<td>24.00</td>
<td>36.30</td>
<td>31.86</td>
<td>88.59</td>
</tr>
<tr>
<td>108</td>
<td>27.00</td>
<td>40.83</td>
<td>35.85</td>
<td>99.66</td>
</tr>
<tr>
<td>120</td>
<td>30.00</td>
<td>45.36</td>
<td>39.84</td>
<td>110.72</td>
</tr>
</tbody>
</table>
Example 5.—Let the ratio of the radii of the convex lens be $1 : 6$, in which the spherical aberration is a minimum, and let the crown and flint flas be as in the first example for a telescope of 30 inches.

Then, by the same process, there will come out

$$ r = 5.32 \quad F = 9.12, \text{ as before.} $$

$$ R = 36.92 \quad \frac{1}{R} = 12.60 \quad F = 13.9, \text{ as before.} $$

This table is proper for flas of the same refractive and dispersive powers as in Table I., but with the spherical aberrations the least possible.

Table V.—Radii of double Object-flas in Inches, where the Convex has a Minimum of Aberration.

<table>
<thead>
<tr>
<th>$\phi$</th>
<th>$r$</th>
<th>$R$</th>
<th>$\frac{1}{R}$</th>
<th>$\frac{1}{r}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>1.06</td>
<td>6.38</td>
<td>2.52</td>
<td>3.10</td>
</tr>
<tr>
<td>12</td>
<td>2.12</td>
<td>12.77</td>
<td>5.04</td>
<td>6.20</td>
</tr>
<tr>
<td>18</td>
<td>3.18</td>
<td>19.15</td>
<td>7.56</td>
<td>9.40</td>
</tr>
<tr>
<td>24</td>
<td>4.25</td>
<td>25.54</td>
<td>10.08</td>
<td>12.50</td>
</tr>
<tr>
<td>30</td>
<td>5.32</td>
<td>31.92</td>
<td>12.60</td>
<td>15.50</td>
</tr>
<tr>
<td>36</td>
<td>6.38</td>
<td>38.30</td>
<td>15.12</td>
<td>18.60</td>
</tr>
<tr>
<td>42</td>
<td>7.44</td>
<td>44.69</td>
<td>17.64</td>
<td>21.70</td>
</tr>
<tr>
<td>48</td>
<td>8.50</td>
<td>51.07</td>
<td>20.16</td>
<td>24.80</td>
</tr>
<tr>
<td>54</td>
<td>9.57</td>
<td>57.45</td>
<td>22.68</td>
<td>27.90</td>
</tr>
<tr>
<td>60</td>
<td>10.64</td>
<td>63.84</td>
<td>25.20</td>
<td>31.00</td>
</tr>
<tr>
<td>72</td>
<td>12.76</td>
<td>76.61</td>
<td>27.72</td>
<td>37.20</td>
</tr>
<tr>
<td>84</td>
<td>14.88</td>
<td>89.38</td>
<td>30.24</td>
<td>43.40</td>
</tr>
<tr>
<td>96</td>
<td>17.00</td>
<td>102.15</td>
<td>32.76</td>
<td>49.60</td>
</tr>
<tr>
<td>108</td>
<td>19.14</td>
<td>114.91</td>
<td>35.28</td>
<td>55.80</td>
</tr>
<tr>
<td>120</td>
<td>21.28</td>
<td>127.68</td>
<td>50.40</td>
<td>62.00</td>
</tr>
</tbody>
</table>

In the preceding example, where the ratio of the two radii of the convex lens were given, $r$ comes out = 5.32 in a thirty-inch telescope; and in like manner, when the aberration only is given, the ratio of the radii may first be determined by a quadratic equation, and then the other curves may be determined as they have been here, without any assumption of $r$ in the convex lens. But in all cases the relative refractive and dispersive powers must be known previously to the calculations such as we have exemplified.

Example 6.—In this example let us take the same crown and flint flas as we did in the second example, and put $r = 7.5$, as in our first example; and then the radii will be as in the following table.

Table VI.—Radii of double Object-flas in Inches.

<table>
<thead>
<tr>
<th>$\phi$</th>
<th>$r$</th>
<th>$R$</th>
<th>$\frac{1}{R}$</th>
<th>$\frac{1}{r}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>1.50</td>
<td>4.47</td>
<td>2.93</td>
<td>6.12</td>
</tr>
<tr>
<td>12</td>
<td>3.00</td>
<td>8.94</td>
<td>5.82</td>
<td>12.24</td>
</tr>
<tr>
<td>18</td>
<td>4.50</td>
<td>13.41</td>
<td>8.73</td>
<td>18.35</td>
</tr>
<tr>
<td>24</td>
<td>6.00</td>
<td>17.88</td>
<td>11.64</td>
<td>24.47</td>
</tr>
<tr>
<td>30</td>
<td>7.50</td>
<td>22.34</td>
<td>14.56</td>
<td>30.58</td>
</tr>
<tr>
<td>36</td>
<td>9.00</td>
<td>26.81</td>
<td>17.47</td>
<td>36.70</td>
</tr>
<tr>
<td>42</td>
<td>10.50</td>
<td>31.28</td>
<td>20.38</td>
<td>42.82</td>
</tr>
<tr>
<td>48</td>
<td>12.00</td>
<td>35.75</td>
<td>23.29</td>
<td>48.94</td>
</tr>
<tr>
<td>54</td>
<td>13.50</td>
<td>40.24</td>
<td>26.20</td>
<td>55.05</td>
</tr>
<tr>
<td>60</td>
<td>15.00</td>
<td>44.68</td>
<td>29.12</td>
<td>61.16</td>
</tr>
<tr>
<td>72</td>
<td>18.00</td>
<td>53.62</td>
<td>34.94</td>
<td>73.40</td>
</tr>
<tr>
<td>84</td>
<td>21.00</td>
<td>62.36</td>
<td>40.76</td>
<td>85.64</td>
</tr>
<tr>
<td>96</td>
<td>24.00</td>
<td>71.50</td>
<td>46.58</td>
<td>97.88</td>
</tr>
<tr>
<td>108</td>
<td>27.00</td>
<td>80.44</td>
<td>52.41</td>
<td>110.12</td>
</tr>
<tr>
<td>120</td>
<td>30.00</td>
<td>89.37</td>
<td>58.23</td>
<td>122.32</td>
</tr>
</tbody>
</table>

Example 7.—Let us take in this example the crown and flint flas as in the first example, and put $r = 9$, as in our second example, and then the radii will come out as in the subjoined table.

Table VII.—Radii of double Object-flas in Inches.

<table>
<thead>
<tr>
<th>$\phi$</th>
<th>$r$</th>
<th>$R$</th>
<th>$\frac{1}{R}$</th>
<th>$\frac{1}{r}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>1.80</td>
<td>1.85</td>
<td>1.83</td>
<td>5.86</td>
</tr>
<tr>
<td>12</td>
<td>3.60</td>
<td>3.70</td>
<td>3.66</td>
<td>11.72</td>
</tr>
<tr>
<td>18</td>
<td>5.40</td>
<td>5.54</td>
<td>5.48</td>
<td>17.58</td>
</tr>
<tr>
<td>24</td>
<td>7.20</td>
<td>7.39</td>
<td>7.31</td>
<td>23.44</td>
</tr>
<tr>
<td>30</td>
<td>9.00</td>
<td>9.24</td>
<td>9.13</td>
<td>29.30</td>
</tr>
<tr>
<td>36</td>
<td>10.80</td>
<td>11.09</td>
<td>10.96</td>
<td>35.16</td>
</tr>
<tr>
<td>42</td>
<td>12.60</td>
<td>12.94</td>
<td>12.78</td>
<td>41.02</td>
</tr>
<tr>
<td>48</td>
<td>14.40</td>
<td>14.78</td>
<td>14.61</td>
<td>46.88</td>
</tr>
<tr>
<td>54</td>
<td>16.20</td>
<td>16.63</td>
<td>16.43</td>
<td>52.74</td>
</tr>
<tr>
<td>60</td>
<td>18.00</td>
<td>18.48</td>
<td>18.26</td>
<td>58.60</td>
</tr>
<tr>
<td>72</td>
<td>21.60</td>
<td>22.18</td>
<td>21.92</td>
<td>70.32</td>
</tr>
<tr>
<td>84</td>
<td>25.20</td>
<td>25.88</td>
<td>25.57</td>
<td>82.04</td>
</tr>
<tr>
<td>96</td>
<td>28.80</td>
<td>29.57</td>
<td>29.23</td>
<td>93.76</td>
</tr>
<tr>
<td>108</td>
<td>32.40</td>
<td>33.27</td>
<td>32.87</td>
<td>105.48</td>
</tr>
<tr>
<td>120</td>
<td>36.00</td>
<td>36.46</td>
<td>36.52</td>
<td>117.20</td>
</tr>
</tbody>
</table>
In this and the six preceding tables, the radii are calculated for an aperture of three inches for a focal distance of thirty inches; and the optician who may use any of them, with similar glasses, may increase or diminish his aperture accordingly as the focal length is greater or less than thirty inches.

If we examine and compare the respective radii, and, also by and 'r of the convex and concave lenses in the preceding tables, which are all calculated by the same process that is used by Tulley, and several of which have been used in practice, we shall perceive that a difference in the quality of the glas, as to divergent and refractive powers, makes the curves of the lenses widely different; and that a small alteration in the assumed value of r, the first face of the convex lens, also produces a great alteration in the curves of the three other faces of the compound object-glass. For instance, if we compare the radii in Table I. with those in Table VI., where r is assumed equal, viz. 7.5, in both, and where the same crown-glass is used, and the flint-glasses alone taken different, the former being No. 2, and the latter No. 1.; the radii in the former are : r = 7.5, R = 11.63, 'r = 10.43, and 'r = 20.86, in a telescope of thirty inches focal length; whereas in Table VI. there is r = 7.5, as before, but R = 22.34, 'r = 14.56, and 'r = 30.58; which curves are very widely different. And if we compare Table II. with Table VII., in both which r is again assumed equal, as well as the crown, while the two flints are reversed, viz. the former having No. 1., and the latter No. 2., the comparison will thus lead in telescopes of thirty inches focal length: in Table II. there is r = 9.00, R = 14.92, 'r = 13.06, and 'r = 40.151; but in Table VII. r = 9.00, as before, while R is r = 9.24, 'R = 9.13, and 'r = 29.50. Hence it is manifest, that it is not only useless but detrimental to copy the radii of a double object-glass of even the best telescope that ever was made by any artificer, unless the refractive and divergent powers of both sorts of glas be precisely the same, in the given and proposed telescopes intended to be equally good: but when different specimens of glas are necessarily used by different artificers, it is hardly to be expected that both the requisite qualities of each piece of glas will be found alike, or even sufficiently near a perfect similitude, to authorize the copying of the radii of a standard telescope, even if those radii could be measured by mechanical means with sufficient accuracy; but the measurement from the polar focus of a lens, as is usual, does not afford data for obtaining the geometrical focus, and from it the radii of curvature, unless the quantity 2 a be previously known; though the converse operation, we have before seen, is not difficult to a practical optician. We have no hesitation, therefore, in condemning the practice of analysing a telescope for the purpose of copying it; for it is the certain guide to irrational constructions; and seldom will an instrument so made be free from either colours or indistinctness.

Neither is it safe to copy tables, such as those published by Dr. Brewster, in his edition of Ferguson’s Lectures, of which the forms are also given under the article Acromatic Telescopes, (in the Edinburgh Encyclopaedia,) until the specimins of glas to be used are ascertained to have the same refractive and divergent powers, as those from which the tables are calculated. On comparing these tables with the results of professor Robison’s calculations, given in the Encyclopaedia Britannica under the article Telescope, we find not only that the bases of these tables is derived from this source, but that the calculations themselves are adopted, without further modification than what is necessary for adapting them to given focal lengths of the compound object-glass. As professor Robison’s article on our present subject has hitherto been considered to be the only article in our language that has disclosed the steps by which an achromatic object-glass may be constructed directly from mathematical calculations; it will be satisfactory to our readers that we should try what curves will result from Tulley’s practical mode of proceeding, when the same data are taken that Robison has used in one of his examples. In an example worked according to Bcicovich’s formula, the ratio of w: n in the crown-glass is taken as 1.526: 1, and in the flint, so high as 1.604: 1; while the ratio of the divergent powers, when converted into the proper terms, are only in the ratio 1 : 1.65, or 1: the curves of a thirty-inch telescope, when r is assumed 9.7, and R = 9.54, according to Dr. Brewster’s Table VI., derived from Robison’s numbers 0.3235 X 30 = 9.6975, and 0.31758 x 30 = 9.5394.

As r is greater than in this assumption, the convergent lens is in its worst position, and the spherical aberration, A., determined by the general theorem of Huygens, will be 1.682 X T ; and as the geometrical focus of the two lenes must be directly as their divergent powers, and as T and T are inversely as those foci, we shall have 1.682 X 1.65 = 2.775 for the proportional aberration A uncorrected; thus as the correcting number, for flint of 1.599: 1, which is the most dense that Tulley has met with, is .826, we may take this without apparent error for that of 1.604: 1; and then 2.775 = 3.26 = I A is the corrected aberration of the concave; and according to this aberration, the root of the quadratic will give R: r as 1: 5.40; and by the theorem \( \frac{2rR}{r + R} \) the rational focus will be \( \frac{2 \times 5.40 \times 1}{5.40 \times 1} = 1.688 \); then having r = 9.7, and R = 9.54, by the same theorem we have F of the convex = 9.618, and F x 1.65 = 15.8697 = F', or focus of the concave. Also we have \( \frac{15.87}{1.688} = 9.401 = \frac{r}{r}, \) or shorter radius of the concave; and 9.401 X 5.4 = 50.76 = r, or longer radius of the concave. Lastly, to obtain the compound focus \( \phi \), we must reduce the geometrical focus of each lens into its refracted focus, by the proper divisors 1.052 for the crown, and 1.208 for the flint; then we shall have \( \frac{9.618}{1.052} = 9.14 \) for the refracted focus of the concave, and \( \frac{15.87}{1.208} = 13.04 \) for the refracted focus of the concave; and by the theorem \( \frac{F' \times \mathbf{F}}{F' - F} \) these numbers will give \( \frac{9.14 \times 13.04}{13.04 - 9.14} = 30.53 = \phi \).

We have now obtained numbers that will enable us to form the desired comparison; thus, according to Robison, \( r = 9.7, R = 9.54, \frac{r}{r} = 47.47; \) but according to Tulley, \( r = 9.7, R = 9.54, \frac{r}{r} = 50.7. \)

Alfo, according to Robison we have \( F = 9.618 \) and \( F' = 13.25 \) geometrical, and the compound focus \( \phi = 29.1. \) But according to Tulley, \( F = 9.618 \) and \( F' = 15.8697 \) geometrical, while the compound focus \( \phi = 30.53. \) Now
TELESCOPE.

Now as \( F : F' :: 1 : 1.65 \) (the respective disperse powers), let us see if either of these results will make an achromatic telescope: thus, as

\[
\begin{align*}
F & = 9.618 \quad F' = 15.8697
\end{align*}
\]

which shows that Tulley's foci are exactly as the disperse powers, and therefore would be achromatic, if the disperse power had been truly proportioned to the refractive power; but from long experience he knows, that the disperse power of flint-glass of the greatest density, compared with that of crown, which seldom varies, is not less than 1.759 : 1. Hence Robison's dispersive power is in the first place taken too low; and in the next, to allow it to be truly taken, he has not preferred the two separate focal distances in such ratio, agreeably to that of the dispersive powers, as will make an achromatic telescope. And this is further proved by the circumstance, that the compound focus does not come out exactly 30, which it will always do by Tulley's process, if the proportions are all rational. If we substitute the ratio 1.759 : 1, instead of 1.65 : 1, for the dispersive power, which Tulley's table of dispersive powers gives, it correspond with the refractive powers, when \( m : n :: 1.599 : 1 \); and if we take the convex lens of Robison in the worst position, as before, with \( r = 9.7 \) and \( R = 9.54 \), the radii of the concave, by Tulley's mode of calculating, will be \( R = 9.65 \), and \( r = 68.04 \), and the compound focus \( \Phi = 25.6 \); with which curves and focal length the telescope would be achromatic, and truly corrected for spherical aberration; but as \( R \) comes out a deeper curve than \( R' \), these surfaces would come in contact at the centre, and therefore are not in a practicable form. Hence we infer that the construction of an achromatic telescope with Robison's convex lens in its worst position is impracticable, though a concave might be determined to fit it in its best position; vis., when its faces are reversed. There is, indeed, no form of a double convex lens, but a concave may be calculated to fit it, provided the curves come out in a practicable form; but, on the contrary, a concave may be fixed on that, in its worst position, which is always its position in a double object-glasses, can have no convex that will match it. Martin has shown, that if the aberration of a given concave be \( a \times T \),

then \( \frac{a}{b} \times T \times \frac{6}{T} = \frac{4}{b} = 6.42857 \) will be a minimum,

whence \( \frac{a}{b} :: 6.43 : 4 :: 16 : 10 \) nearly. Therefore, when \( \frac{4}{b} \) is less than 6.43, the problem will be impossible. For instance, in a plano-concave lens, the aberration is \( \frac{a}{b} \) of \( T \), and \( \frac{6}{T} = 4.66 \), which would not be less than 6.43; and therefore this lens cannot be used singly with a convex of any description; much less can a concave in its best form, where \( r : R :: 1 : 6 \), be used; for its aberration \( \frac{15}{14} \times T \) gives \( \frac{4}{b} = 4.284 \) only. But either of these may be used in their worst position, because then either of them will have aberration enough for any convex. And this previous consideration will enable the skilful optician to fix on a proper ratio of \( r : R \), before he proceeds to his calculation. Should it be asked, why we prefer Tulley's dispersive powers to professor Robison's? Our answer is this: that Tulley's were not gained simply by prismatic measurement of the spectrum, like Robison's, where some errors are obviously unavoidable; but have been corrected by repeated comparison of the focal lengths of the convex and concave lenses in the very best achromatic telescopes selected for the purpose, where, when a high magnifying power was used, the least defocussing would have been observable; and as these foci are always in the same ratio as the disperse powers, no other method of determining these powers can have similar pretensions to accuracy.

When the convex and concave lenses are both ground and polished (see Glass and grinding), they require some care in putting them properly into the tube, so that they may have their common axis coinciding with the axis of the eyepieces, in order that every part of the field of view may be equally distinct and free from colour; and as there will always be some errors of workmanship, and as both lenses, but particularly the flint, may not be perfectly homogeneous, one of the lenses must be turned round in the common cell, till the faults of one lens are observed to correct those of the other as much as possible; which will be known when the vision is most distinct, or the object bell defined. Should any colour remain about the edges of the object, the prismatic aberration is not corrected; and if indiscriminate errors do not take place soon, and at equal distances from the point of distinct vision, when the eye-tube is moved in and out, the correction for spherical aberration is not perfect. A double object-glasses is much more easily adjusted for a good central position, and for the counteraction of opposite errors of workmanship and imperfectness of glass, than a single one, and has moreover more light, in consequence of having but four reflecting surfaces; but as it does not admit of any change of the faces in the final adjustment, the lenses require to be both truly calculated and nicely worked, in order to make the practice correspond with the theory; which is probably the reason why triple object-glasses, that admit of changes in their positions, are most frequently made, particularly for short telescopes: besides, half a dozen of these lenses may be ground and polished at the same time; whereas, for a double object-glasses, each lens requires to be ground and polished separately, and with the greatest care.

Triple achromatic Object-glasses.—After having explained the theory, and exemplified the construction of a double achromatic object-glasses with great minuteness, we come now to treat of triple object-glasses, that shall have the achromatic property; but it will not be necessary to give so many examples, nor such minute explanation, as seemed requisite in our preceding part of this subject, seeing that the calculations for a triple object-glasses are grounded on those that we have given for a double one, and do not materially differ from them. It will, however, be proper to shew how the compound focus of three lenses is determined, before we proceed to find the achromatic proportions of the respective radii.

First, we must have recourse to our fundamental theorem, (of Table I., of theorems for the refractive foci of lenses,)

\[
\text{viz.} \quad f = \frac{pdR}{d^2 + dr - pRr},
\]

where \( p \) is the reciprocal of the refracting power of the medium employed, or of \( \frac{m-n}{n} \), the measure of that power, \( r \) and \( R \) the radii, as before, and \( d \) the radiant distance. To apply this theorem to a system of glasses, as B, C, D, &c. which we propose doing, it is convenient to sublimate, for the general expression \( f \), the letters \( a, b, \) and \( c \), as peculiar to each medium

\[
\begin{align*}
\frac{p}{f} & = \frac{b}{a} \times \frac{c}{b} \times f
\end{align*}
\]

respectively. Supposing now our three lenses arranged in the order B, C, D, with B next the radiant object (as in K k

Vol. XXXV.
TELESCOPE.

fig. t2. Plate XXVIII.), we first determine the focus of B, which becomes in this case, if we substitute \( \frac{1}{a} \) for \( \beta \),

\[
F = \frac{d r R}{d r + d r - \frac{R}{a}} = \frac{d r R}{a d R + a d r - R r}.
\]

Now \( f \), the focal distance of B, thus found, is manifestly the radiating distance of the second middle lens C; and as the general theorem above referred to involves the radiating distance \( d \), we have only now to apply that theorem again to the second lens C, substituting, as before, \( \beta \) for \( \frac{1}{\beta} \), and for \( d \), the quantity last found as the focus of B. This gives the compound focal distance of these two lenses B and C, which we will call \( \phi \); and this again becomes the radiating distance of the lens D: therefore, lastly, the general theorem is again applied to this lens, substituting \( \phi \) for \( \frac{1}{\beta} \), and the

last found focus \( (\phi) \) for \( d \); by which processes, we arrive at the compound focus \( (\phi) \) of all the three lenses. In the application of these successive steps, it will be proper to attend to the signs of the quantities, where one of them, which in our case is the middle one, has its focus negative with converging rays. To exemplify this process in a triple objective lens for parallel rays, let B represent the outermost lens, which we will consider as a double convex lens with

\[
\frac{m - n}{n} = a = 0.53, \quad \text{and} \quad r \quad \text{and} \quad R \quad \text{each} = 10; \quad \text{let} \quad C \quad \text{be the double concave of similar radii} \ 'r' \quad \text{and} \ 'R', \quad \text{and with} \ \frac{m - n}{n} = b = 0.6; \quad \text{and let} \ D \quad \text{be a plano-convex, and consequently R}
\]

infinite, but \( r = 10 \), as before, and \( \frac{m - n}{n} = \epsilon = a = 0.53 \);

then for the focus of B, putting \( \frac{1}{\beta} = a \), we have \( \frac{1}{a} = \frac{d r R}{d r + d r - \frac{R}{a}} = \frac{d r R}{a d R + a d r - R r} = \frac{d r R}{a d R - R r} \)

\[
(ad R \text{ being neglected, when } R \text{ is infinite}) = \frac{d r}{a d - r}; \quad \text{and since } \frac{r}{a} = \text{ infinite with parallel rays, the expression becomes}
\]

\[
\frac{r}{a} = F, \quad \text{as in our first table of theorems for the refracted foci of lenses, for the first lens B. This expression is now put for } d, \quad \text{when we come to consider the theorem as applied to C: here we have} \ \frac{1}{\beta} = b, \quad \text{and the expression}
\]

becomes \( \frac{1}{b} \times \frac{d r R}{d r + d r - \frac{R}{b}} = \frac{d r R}{b d r + b d R - R r} \)

then, as \( r \) is taken equal to \( R \), it will be \( \frac{d r}{2 b d - r} = F \)

of the lens C. Now, if in this expression we substitute \( \frac{r}{a} \),

the focus of B, for \( d \), we have for \( \frac{d r}{2 b d - r} \) \times \frac{r}{a} \]
in practice, when \( r \) and \( R \) are unequal, from our former practical theorems, thus: let us determine the compound focus of \( B \) and \( D \) by the theorem \( \Phi = \frac{F \times F}{F + F} \), as they have each a positive focus, and call this focus \( \frac{F}{2} \), geometrical, and then \( \frac{\Phi}{2a} \) will be \( \Phi \) refracted; and secondly, let \( F \) geometrical be turned into \( \frac{F}{2b} \) for the refracted focus of the concave \( C \); and then, by the theorem \( \frac{F \times \phi}{F - \phi} = \Phi \), we shall have \( \Phi \) for the compound refracted focus of the triple object-glasses, or length of the telescope: for example, taking the same data as before, we shall first have \( \frac{10 \times 20}{10 + 20} = \frac{200}{30} = 6.66 = \frac{\Phi}{2a} \), and \( \Phi = 6.66 \), or \( \frac{\Phi}{2a} = 6.28 = \frac{\phi}{2a} \); and hence, \( \frac{\phi}{2a} = 6.33 = \frac{\phi}{2a} \), because \( \Phi \) has a negative focus, we get

\[
\Phi = \frac{\phi \times F}{\frac{F}{2b} - \phi} = \frac{6.28 \times 6.33}{52.33 - 2.05} = 25.53 = \Phi,
\]

as was required.

We shall use this method of finding the compound focus \( \phi \) of two lenses, and also \( \Phi \), the focus arising from all the three lenses, where it is to be understood that \( a \) is the symbol for the refractive power of both the crown lenses \( B \) and \( D \), taken together; and that \( a \) express the refractive power of \( C \), the concave, by the symbol \( b \), as a subitute for \( a \).

We must further premise, that when \( T \), the thickness of each lens \( B \) and \( D \), is not considered, we shall find presently that the spheric aberration, arising from any single lens that receives the rays of light, may be diminished as \( 4 : 1 \), by the combination of two lenses, to be substituted for that one. Bearing these premises in mind, we now proceed to the consideration of a triple object-glasses, that shall have the due corrections for both the prismatic and spherical aberrations. It will greatly facilitate both our explanation and exemplification, if we suppose the two convex lenses \( B \) and \( D \), having a compound focus \( \phi \), to be represented by a single lens \( E \), with the focus \( \phi \), but with a diminished aberration; for then we may proceed nearly as in our seven preceding examples; but reversing the process, when the concave has its radii given, to find the convex lens.

Example 8.—Let it be required to construct a triple achromatic object-glasses of 30 inches focal length, with the same refractive and dispersive powers as in the first example; viz., with \( m : n \) in the crown as \( 1.528 : 1 \), and in the Flint as \( 1.5735 : 1 \); and with the dispersive powers as \( 1 : 1 \), and let the two radii of the convex be each \( 1.539 \), fo as to have \( T \), as in the first example.

In the first place we have \( r : R :: 1 : 1 \), and, as we have seen above, \( A = 1.666 \times T \), by the general theorem of Huygens; in the next place, because the concave \( C \) is given to find the convex \( E \), the correcting number \( z \), found as before, becomes a multiplier, in a reversed operation, and we have \( 1.666 (A) \times T \times 883 (z) = \frac{1.4715}{T} = \frac{1.4715}{T} \) is \( \Phi \); we must also use the former multiplier \( 1.524 \) (the dispersive power, or proportional focus) as a divisor, and then we get

\[
\frac{1.4715}{1.524} = \frac{0.6555}{T} = A \text{ of the substituted lens } E, \text{ with a focus } \phi; \text{ but there is no such small quantity of aberration in any one lens. Let us however see what the absolute aberration } A \text{ will be, unconnected with the factor } T, \text{ which factor we have determined, from the verified lines to the radii } 13.9 \text{ and } 13.9, \text{ to be } = 0.653; \text{ therefore } 1.4715 \times 1.653 = \frac{1.4715}{T} \text{ absolutely. Now we have seen, in the first example, that } \frac{2.52}{2} = T \text{ of the proper convex; let us now consider that } \frac{2.52}{2} = 1.26 = T \text{ in one of the lenses } B \text{ and } D, \text{ which we propose to make in every respect similar, in order to have as few different curves, and consequently as few different tools, as possible; then, because } 2.432 \text{ is the absolute aberration of } C, \text{ the concave, we have } 2.432 \times \frac{3.86}{1.26} = 13.9 = T \times A = \text{ of either of the convex lenses; but } T = 1.26; \text{ therefore } 1.93 \times 1.26 = 2.432 \text{ is the absolute aberration of each convex lens, exactly equal to the absolute aberration of the concave. But we have assumed, and shall demonstrate hereafter, that when the thickness of the lenses is neglected, a proper combination of two lenses, placed at a certain distance from each other, will diminish the aberration belonging to one time four times, and even when the distance } = \phi, \text{ this will be nearly the case: now we have } 1.93 \times T = A \text{ in the lens } E \text{ of equal focus, let us leave it out, } A, \text{ and multiply by } 4, \text{ and we have } 4 \times 1.93 = 3.86 \text{ very nearly, the sum of the aberrations (without } T) \text{ of the two convex lenses } B \text{ and } D, \text{ taken together; viz. } 2 \times 1.93 = 3.86; \text{ but yet the absolute aberration of each separate convex lens } \left( T \text{ being considered} \right) \text{ is exactly equal to the absolute aberration } (T \text{ considered}) \text{ of the double concave. This relation of the respective aberrations being once established and confirmed by practice, which Tullery affirms to be the case, simplifies the complex business of calculating a triple object-glasses: for the sum of the absolute aberrations of the two convex lenses of glass lenses, must be always equal to double the absolute corrected aberration of the concave alone, in order to have a due correction for spheric aberration, and consequent indistinctness. Hence, when the focal distance, } \phi, \text{ of the two convex lenses } B \text{ and } D \text{ is in the same proportion to } T, \text{ the focal distance of the concave, that their separate dispersive powers are relatively to that of the concave } C, \text{ the relative radii of either } B \text{ or } D, \text{ or both, may be varied at pleasure, provided that the sum of their absolute aberrations remain equal to double the absolute aberration of the concave } C, \text{ and provided that } \phi, \text{ their compound focus, be not altered. But we have not yet adjusted the two focal distances so as to make the object-glasses achromatic, and } \phi, \text{ or the compound focus of the three, to be equal } 30 \text{ inches. From an equation of the aberration } 1.93 \times T, \text{ or from } 2.432 \text{ absolutely, we find the ratio of } r : R \text{ in each lens to be as } 1.34 : 1, \text{ which is also agreeable to Tullery’s tables, from which this ratio may be had by inspection; also the rational geometrical focus for these numbers is } 1.145. \text{ Now according to our first example, we have seen that when } F = 13.9 \text{ in a telescope of } 30 \text{ inches focal length, } F \text{ will be } 9.12, \text{ when there is only one double convex lens; but here we have two lenses to produce } 9.12 = \phi, \text{ and therefore, as both lenses are to be alike, we have } 9.12 \times 2 = 18.24 = F \text{ for each separate focus; therefore } 18.24 \text{, } 15.93 \times 1.34 = 21.35 \text{, and } R \text{ for both.}
TELESCOPE.

and the result of our calculation will stand thus;

First convex B \( \{ r = 21.35 \} \times T = 18.24 \), and \( A = 1.93 \)

Concave C

\( \{ r = 13.9 \} \times T = 13.9 \), and \( 'A = 1.4715 \times T = 2.432 \).

Second convex D

\( \{ r = 21.35 \} \times T = 18.24 \), and \( A = 1.93 \)

Also

\( \{ F \times F \} \times T = 9.12 \)

And

\( \times T = \phi = 0.0 \)

It is hardly necessary to observe, that the quantities \( T \) and \( 'T \) are here given in numbers, for the sake of illustration; but when the quadratic equation is worked, those symbols may be exterminated, and their values involved in the process.

A table of radii for triple object-glasses, in which the two convex lenses of crown-glass, and the one of flint, have respectively the same refractive and dispersive powers as in Table I., and \( 'r = R \).

Table VIII.—Radii of triple achromatic Object-glasses.

<table>
<thead>
<tr>
<th>B Convex</th>
<th>C Concave</th>
<th>D Convex</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \Phi ) r R ( 'r ) R &amp; r R</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 4.27 3.19 2.80 2.80 4.27 3.19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 8.54 6.38 5.60 5.60 8.54 6.38</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 12.81 9.56 8.40 8.40 12.81 9.56</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24 17.08 12.74 11.20 11.20 17.08 12.74</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30 21.35 15.93 13.90 13.90 21.35 15.93</td>
<td></td>
<td></td>
</tr>
<tr>
<td>42 29.89 22.30 19.50 19.50 29.89 22.30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>48 34.16 25.48 22.30 22.30 34.16 25.48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>54 38.43 28.67 25.09 25.09 38.43 28.67</td>
<td></td>
<td></td>
</tr>
<tr>
<td>60 42.70 31.86 27.80 27.80 42.70 31.86</td>
<td></td>
<td></td>
</tr>
<tr>
<td>72 51.24 38.22 33.40 33.40 51.24 38.22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>84 59.78 44.00 39.00 39.00 59.78 44.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>96 68.32 50.06 44.60 44.60 68.32 50.06</td>
<td></td>
<td></td>
</tr>
<tr>
<td>108 76.86 57.34 50.10 50.10 76.86 57.34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>120 85.40 63.72 55.60 55.60 85.40 63.72</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Example 9.—Let it be required to construct another triple object-glass of 30 inches focal length, with crown and flint-glass exactly similar to what was used in the last example, but where the radii of the concave be unequal, \( \Phi ' : R :: 1 : 1.1 \).

The following is a table of radii for triple object-glasses, where the refractive and dispersive powers are as in the last example, but where the radii of the concave are unequal, \( \Phi ' : R :: 1 : 1.1 \).

Table.
Neither is it desirable, in a good achromatic object-glass, to use varnish of any description, as has been recommended.

As we have shown that professor Robinon's data, and the calculations founded on them, do not produce curves proper for an achromatic double object-glass, we will conclude this part of our subject by examining if his calculations for a triple object-glass are any better adapted for practice. In Dr. Brewster's Table V. (Appendix to his edition of Ferguson's Lectures, vol. i. p. 418.) a thirty-inch triple object-glas is calculated, according to professor Robinon's report of the radii used by the London artists, to have \( r = 18.84 \), (printed by mistake 18.34,) \( R = 22.47, r' \) and \( R' \) each 17.37, and the second convex the fame as the first; where, as before, the ratio \( m : n \) in the crown is taken as 1.526 : 1, and in the flint as 1.604 : 1, and the ratio of the dispersive powers as 1 : 1.65. If these numbers will make an achromatic object-glass, we shall have 1 : 1.65 :: F' : F exactly; i.e. the ratio of the dispersive power will also be the ratio of the geometrical focal distances, agreeably both to theory and practice; but we have, by the theorem

\[ \frac{2rR}{r + R} \times 18.84 \times 22.47 \times 18.84 + 22.47 = \frac{84.6666}{41.43} = 20.495 \]

for the focus of one convex lens, and therefore

\[ \frac{20.495}{2} = \frac{10.247}{2} \]

for the compound focus of the two; also we have the focus of the concave = 17.37 in the table, the radii being equal; hence we have as 1 : 1.65 :: 10.247 : 16.92, instead of 17.37; therefore the object-glasses is not duly corrected for the prismatic aberration. This conclusion, which is intelligible by every common reader, corroborates our former inference respecting the want of achromaticism in the double object-glasses made from Robinon's calculations; but let us pursue the enquiry a little farther, and see what focal distance will accord with these numbers: the refractive power of the convex being 0.604 = \( a \), we have

\[ \frac{10.247}{2} = \frac{9.74}{2} \] for the refracted focus thereof; and the refractive power of the concave being .526 = \( b \), we have

\[ \frac{17.37}{2b} = \frac{14.38}{2} \]

for its refracted focus, and by our theorem

\[ \frac{F 	imes F}{F - F} = \phi \] we have

\[ \frac{14.38 \times 9.74}{14.38 - 9.74} = \frac{140.6}{40} = 3.5 \]

for the focal length of the object-glasses, which is much nearer to the proposed length than the focus of the double object-glasses was which we before examined. If we calculate this triple object-glas according to our method, as practised by Tulley, we must begin with 16.9 as the proper focus for the concave, of which we disregard the negative sign, as of no importance in our mode of calculating; we shall then have as 1.65 : 1 :: 16.9 : 10.247, and this ratio must not be compromised, on any consideration, as being the achromatic ratio, on a supposition that the refractive and dispersive powers, as above stated, are in natural proportion; then as the radii \( r \) and \( R \) are assumed equal, the aberration of the concave will be

\[ 1.666 \times T, \text{ and } z = .826; \text{ therefore } -\frac{1.666}{.826} = 1.376 = \frac{A}{1.65} \]

corrected; and \( 1.376 = .834 = A \) of the substituted single lens \( E \), which, as before, is an impossible quantity to be in one lens; but this being doubled, will be 1.666 \( \times T \) for the proper quantity of each lens; or multiplied by 4, will be a proper
proper quantity for the sum of both the convex lenses; then
\( T' \) being found = 1.16, and \( T = .112 \) in each convex, we
shall have \( A = 1.668 \times 2 \times .112 = 1.871 \) for each convex,
and \( A' = 1.576 \times .156 = 1.371 \); also, for the concave,
and consequently the ratio of \( r:R = 1.01:1 \); then by
using the proper theorems, as before directed, the radii will
come out \( r = 20.57 \), and \( R = 20.37 \) in each convex,
while the concave will have each of its radii = 16.9, as
originally assumed; and if the diffractive was great enough
for the refractive power, as above specified, not only would
the object-glafs be achromatic, but its focal length would be
= 30. But we find the geometrical \( F = 16.24 \), and re-
fracted \( F = \frac{.1024}{1.056} = 9.696 \), and \( \frac{T'}{T} = \frac{16.9}{2} = 1.98 \),
\( \frac{a}{a} \) gives
\[ 14.107 \times 9.696 = 9.696 \]
\[ = \frac{136.781}{4.451} = 31 \] very nearly; and hence we infer, that the
diffractive and refractive powers are irrational in this
calculation, and the excess in the focal length is double the
quantity with these two convex lenses, B and D, to
what we found it with one, in a double object-glafs,
in our former examination. We are however disposed to
depreciate the mathematical labours of a man, whose
memory will always be dear to every lover of science, and
whose article Telescope in particular has obtained the encomium of an eminent contemporary mathe-
matician; but we have felt it our duty to point out the
source of inaccuracy, which, by entering into the data, has
affected the result of long and tedious calculations, and may
have given much trouble to many, as we know it has done to
some opticians, who have attempted to copy those results in
practice. The learned professor has indeed stated, as he
proceeds, that the value of certain appreciable quantities has
been neglected, to simplify the processes; and if those
quantities had affected the focal distance more, and the ratio
of the radii \( r:R \), and also that of \( F:F' \), the resulting
prismatic and spherical corrections might have been more
perfect, even with a defect of diffractive power, than we now
find them. We have not room, however, to enter farther
into particulars.

From Dr. Brewster's experiments, made in his "Treatise
on New Philosophical Instruments," it appears that the
green ray is not always in the middle of the solar spectrum,
and that with rock-crystal it is at the opposite side of the
mixture of the middle from what it is in glass; hence Tuley infers, that if
glass could be found of the fame diffractive power as rock-
crystal has, the intermediate colours might be corrected
as well as the extreme colours; and that the secondary
spectrum would disappear. To effect this improvement, the
convex lens of rock-crystal must be at one side of the
crystal of flint, and the convex of crown or other glass,
with equal diffractive power to that of the crystral, must be
at the other side. This object is worthy of the optician's
future consideration and pursuit.

Celestial achromatic Eye-piece.—We have already explained,
in the former part of this section, how the focus of two
glasses, placed at a given distance from each other, may be
ascertained, and also what is the focus of a single imaginary
lens that shall be equal to them both in power; we propose
therefore presently to return to the same figure, (fig. 8,
Plate XXIV.) in order to shew what the advantage will be
in point of indistinctness, which is as essential a quality in an
eye-piece as power. But, in the first place, let us suppose
in fig. 10, the points \( 1, 2, \) and \( 3 \), so many points of an ob-
ject, of which the image is formed at \( F \), after passing
through any lens \( A B \); then as the point \( 1 \) has rays influ-
ing from it, that fall on every part of the lens, and as these
rays are differently refracted at different distances from the
axis, both towards \( A \) and towards \( B \), there will be several
images of this point at the focus \( F \), lying contiguous to each
other; but the rays that come to a focus, after passing in
and near the central part of the glafs, will form their images
very closely together, so as very nearly to coincide. The
same will be true of the points \( 2 \) and \( 3 \) separately considered,
under the same circumstances, so that while the single lens
\( AB \) continues to produce both prismatic and spherical
aberrations, there will be a confusion or indistinctness in the
image, arising from a promiscuous mixture of a number of
tenuous and nearly coincident images arising out of the
spherical figure of the lens, as well as fringes of colour
arising out of the dispersion of the differently refrangible
rays. This indistinctness is more considerable in a lens used
as an object-glas, than as an eye-piece; because the image
formed by it becomes an object to be viewed by means of
the eye-piece, and therefore any distortion, confusion, or
colouration that exists in the image, will be magnified by the
eye-piece; and the greater the magnifying power, the greater
will be the evil produced thereby. To obviate this con-
sequence, which will exist partially, even when the best com-
posed object-glafs is used that art can accomplish, the single
eye-glass has been laid aside, and a system of glafs subtili-
tated, that will admit of a high power in the eye-piece, with-
out a proportionate increase of indistinctness or of colour
in viewing the image. The first arrangement of two glafs,
as a substitute for one, to be used as a celestinal eye-piece,
wherein inverion of the object is not material, was calculated
and applied by the ingenious Huygens, who, not aware that
the prismatic aberration could be cured by an opposition
of diffractive powers, according to Dollond's noble discovery,
devoted the method of reducing the quantity of spherical
aberration by division; and the result of his investigations
was, that two plano-convex lenses, (which have each but
little aberration in their best positions,) when placed at such
a distance from each other that their focal points, for par-
allel rays, might coincide, would have such a compound
focus, as would not only greatly increase the power, but still
more diminish the spherical aberration. An arrangement of
this fort was put into the hands of W. Molyneux by Mr.
Flamstred in the year 1686, of which Molyneux determined
the compound focus, depending on the radius of curvature
of the two glafs and the distance between them, in the man-
ner we have above explained. But the first mathematician
who gave the rationale of the advantage to be derived from
a combination of lenfs, as they have reference to the spheri-
cal aberration, was Sir Isaac Newton, whose method of
explaining it Martin has given in his New Elements of Opti-
ics, part 1, p. 27, thus: "Let \( N . M . (9, 9.) \) be the
spherical surface of a plano-convex lens \( N . M . B . \); the
centre; \( C \) the radius or demi-diameter taken in the axis;
A N an incident ray; and N K the fame refracted, cutting
the axis produced in the point K. Also let \( F \) be the focus
of parallel rays which pafs through the glafs infinitely near
to the axis; let \( F D \) be a perpendicular to the axis in the
point \( F \), then will \( K F \) be the curve or difference of the
focal distance of parallel rays which are incident near the
axis, and at the distance \( G N \), the semi-aperture of the
lens. This is called the aberration of the extreme ray in
longitude. Again, let any ray \( a n \) be incident on the other
side the lens, at the distance \( b G \), the refracted part of this
ray, \( a d \), will intersect the other refracted ray ND in the point
\( Q \), at the perpendicular distance \( Q \) O from the axis.
is called the lateral error, or the aberration in latitude. It is evident from the figure, that as the ray (an) approaches the extreme ray AM, the point of interection Q will approach the axis; and when an coincides with AM, the point Q will coincide with the point K in the axis; and it is as obvious that the point Q will coincide with F, when the ray (an), approaching the axis a B, at last becomes coincident with it; therefore there is one position of the ray (an), in which it will cut the ray ND in a point Q, which will make QQ a maximum, or the greatest of all. If we take the arc B m = B n, and B M = B N, the rays incident on m and M will intersect in the point P on the other side, and so make PQ = 2 Q O; and it is also plain, that all the rays which fall on the lenses between N and M are refracted through the space PQ. Now PQ is the diameter of the least circular space possible, in which all the rays can be congegrated, because there will be some ray (an) that will meet the extreme ray ND, at the distance Q O = ½ PQ from the axis. Hence it follows, that the circular space is the focus, or place of the image of an object, belonging to parallel rays incident on the lens NM. Further, by reason of similar triangles K Q O, K F D, and N C K, we have Q O = K O :: D F :: K F :: N G :: G K. But it is demonstrable, (see Philos. Britannica, 3 edit. p. 58. art. 14.) that when Q O is greatest, then K O = ½ K F, and also that K F is always | of G B, the thickness of the lens; so then K O = ½ G B, and consequently G K = G N :: G B :: Q O, whence

\[ \frac{8 G K}{G B \times G N} = O Q; \] 
whence PQ, the diameter of the circle of aberration, is known for any given lens.

"It has been demonstrated, that the error PQ will always be proportioned to B C; so that when the radius is given, the error will be as the cube of the aperture directly: and when the aperture is given, the said error will be as the square of the radius inversely. It has also been demonstrated, that when the convex side of the lens N B M is turned towards parallel rays, the error K F will be but | of the thickness of the lens G B, and therefore near four times less than in the other case; for | G B :: : G B :: 54 : 14, which is almost as 4 to 1."

"It has been further demonstrated, that the aberration PQ is as the square of the sine of refraction (the sine of incidence being unity) in all media of different refractive powers: thus if a lens of the same focal distance and aperture were made of glass and water, and suppose those lines in glass to be as m : n, and in water as m : n²; then will PQ in the glass lens be to the sine in the water lens as m : m², or the area of the circles of aberration, and of course the differences of the object will be as the refractions m and m² of the media.

Whatever has been observed with regard to convex and plano-concave lenses, will hold good in concave and plano-concave ones. And in both forts, it is suppos'd that all of them have the same focal distances, apertures, and thicknesses, while we are comparing their respective aberrations.

"Hence it is very evident, that if rays proceed from any point, as (a) at an infinite distance to a lens NM, (fig. 10.) the image of that point will not be a point, but the area of a circle, whose diameter is PQ; and, therefore, that point cannot be distinctly represented, but will be rendered indistinct and confused in proportion to the area of the said circle of aberration in the lens, as it is the image of this circle (or dilated point) that is impressed on the retina, and excites the idea of the point in the mind."

"Hence it appears all, that the points in the surfaces or substances of bodies cannot be perfectly and distinctly seen, as each of them will be dilated into a sensible area; and such as are contiguous, as 1, 2, 3, will have their confused images all blended together nearly in the same space, viz. in the circle of aberration, the diameter of which is PQ."

"Therefore the stars, which as to sense are only lucid points, will appear to have some magnitude (and not as points) in the focus of the best sort of telescopes, even supposing there were no other cause of confusion or indistinct vision, besides what resulted from the spherical figure of the lens."

"Now, if the error from a spherical surface, or, which is the same thing, the indistinctness of vision, depending on, and concomitant with, the spherical aberration of a lens, is as the square of the radius inversely; the indistinctness of vision, on the contrary, will be as the square of the radius directly; and, therefore, if, by means of two glasses, we can get the view of an object, where the radii of the glasses bear a greater proportion to their respective apertures, than the radius of a single glass of equal magnifying power does to its aperture; it is evident the indistinctness of that view will be propagated in proportion to the square of that ratio.

"For example, suppose (fig. 8.) F = D = y, or OF, to be the focal distance of the lens GH, so that the focus of each of the lenses NM and GH falls on the same point F; then, by the proper theorem, we have x = \(\frac{1}{2} y\), or QF = \(\frac{1}{2} CF\); also, since in this case we have F = \(\frac{y}{x}\), therefore \(\frac{1}{y} = \frac{3}{y}\), or QF = \(\frac{3}{y}\). Now, since we have the same optic angle GFO by both the glasses, as by the single one EE, the ratio of the radius of the aperture FO to the aperture GO, or of the radius CF to the aperture NC, is double the ratio of OF to OG, or of the radius QF to the aperture EQ, and therefore the indistinctness of vision by both the lenses is four times greater than that by the single lens EE.

"The same thing may be demonstrated from the consideration, that the aberration PQ is, in the same glass, always proportional to the cube of the semi-aperture EQ, or one half of the optic angle EFQ; and that in small angles (as in the glasses of telescopes, &c.) the fine EQ is nearly as the angle EFQ. The aberration, therefore, being as the cube of that angle, it is plain, if we make the same angle by two refractions instead of one, the quantity of the aberration will be greatly increased, since the sum of the cubes of the parts will be much less than the cube of the whole; and when the parts are equal, the sum of the cubes of each will be but a fourth part of the cube of the whole. Thus, if the whole angle EFQ be as \(\frac{1}{2}\), the cube thereof is \(\frac{1}{8}\); but the half is \(\frac{1}{2}\), the cube of which is \(\frac{1}{2}\), and twice that, \(\frac{1}{4}\), which is as the aberration arising from the two halves, and is therefore but a fourth part of the whole.

"This is evidently the case when the optical angle GFO (= EFQ) is made by two refractions, by the two lenses NM and GH, so that, the focus of each may fall on the same point F; for then the angle GFO = LGF, which is composed of the two angles LGF = T NF = G FO, (by reason of the parallel lines TN, LG, and FC,) which is the part made by the lens NM. Also the angle FGf is the refraction of the ray NG, or second refraction of the ray AN; and since, in the present case, OF = FF, and OF in small angles is equal to GF nearly; therefore the angle GFO is equal to the angle FGf very nearly, those angles being in the same ratio with the equal lines Gf and FF, when they are not large; and the optic angle GFO = GFO + FGf; consequently the aberration PQ is but a fourth part so great by the two lenses NM and GH together, as it is by lens EE alone.

"But to render this theory general for any position or form of
of the lenses NM and GH, it is evident, since the aberration is lessened by dividing the optic angle, that the diffuseness of vision will be thereby promoted; and because each of the angles contribute thereto in proportion to its magnitude, the joint effect of both parts, or angles GFF and JGF, will be as the product or rectangle under both, or as the rectangle of the lines OF and FF; but, according to our former notation, \( FF - DF = ff \); consequently \( FF - DF - ff = c \), whence \( F = D = 2f \); or \( FO = 2OF \); that is, \( OF = fF \), or the angle \( GFF = JGF \), in the left position of the lenses, as before demonstrated.

"Consequently, since in that position we have shewn the diffuseness of vision to be four times as great as by a single lens, this will be the whole effect of a combination of two glusses, and it may be shewn that three glusses will produce nine times the diffuseness, and so on in proportion to the square of the number of glusses; but then if we consider the evil to be remedied is but small, and the damage we sustain in loss of light and irregularity of refraction through so many lenses, we may soon make the remedy worse than the disease; and every thing considered, it appears probable that two lenses are better than a greater number, particularly for a celestial eye-piece."

By similar reasoning we may explain the advantage of any other eye-piece, as Bolchovis's, when we know the radii, the position, and the distance of the lenses that compose it. The Huygenian eye-piece, which we have said has the foci of the two plano-convex lenses, as 3:1, at the distance of 2, with 1 next the eye, and the curvus exterior to the eye, is peculiarly adapted for a reflecting telescope that has only the spherical aberration; but for a refracting telescope, though achromatic, a little deviation from this form was found necessary to correct the remaining prismatic aberration also. On enquiring of the best opticians, we learn that the final adjustment of distance between two lenses, in a celestial achromatic eye-piece, is made from trials in the tube of the telescope it is intended for; because this distance, and indeed the ratio of the radii of the two lenses, will greatly depend on the flat of convergence of the rays, when they are incident on the first surface of the interior glasse; and this flat will depend on the focal length of the telescope, conjointly with the aperture, and achromatism of the object-glass; so that it would not answer any good purpose to give a table of dimensions, which might mislead rather than assist the young optician in his practice. The form of an achromatic celestial eye-piece, composed of two plano-convex lenses, is represented in Plate XXVIII. fig. 13, where the distance exceeds the focal length of the lens next the eye, and in which consequently the image is between the lenses; which is the usual construction when the heavenly bodies are viewed without any reference to the measurement of angles; but as the place of the image will vary in some degree with a change of distance, in taking terrestrial measures, there is another form, commonly called Ramden's, which is more suitable for micrometrical measurements; because the image, being beyond both lenses, (counting from the eye,) keeps its place, as it regards any scale, wire, or spider's line, that may be used in a micrometer: this form is given in fig. 14, of the same plate, and has the position of the interior face reversed, so that the plane face may be parallel to the contiguous image to be viewed: these two lenses are sometimes alike, and always nearly so, in focal length; and the distance between them is less than the focal length of either by such a quantity, that the compound focus falls just beyond the flat face of the interior lens 2, where the image and scale, wire, or line coincide in due adjustment for vision. This form has likewise the advantage of reduced aberration, and is sometimes called the positive eye-piece, in opposition to the other form, which is therefore by some astronomers called the negative eye-piece. This positive eye-piece is also best adjusted to the instrument of which it is destined to form a part; and either lens may exceed the other in focal distance in a small degree, as circumstances may require.

When this eye-piece is used with a transit instrument, zenith sector, equatorial, or circular instrument for taking altitudes, it is convenient to put a diagonal reflector between the lenses, and to have the eye-lens in the side of the tube, for the purpose of taking observations in high altitudes, or even in the zenith. This form is seen in fig. 15. of the same plate, and is called a prismatic eye-piece.

The terrestrial eye-tube is that which gives an erect position to the object, as viewed in a telescope of the refracting sort, to which only it is applied, though it might be applied to the Calegrainian reflector with equal advantage. It has been seen that, originally, this eye-piece was composed of three similar lenses, placed from each other respectively at the focus of their focal distances, as in fig. 3. Plate XXV. In this arrangement the magnifying power is not increased, unless the lens, T, nearest to the eye has its focal distance diminished more than the rest; but the aberration that would arise from the figure of the field-lens C D, is diminished about nine times, if we disregard their thicknes, viz. as the square of the number of glusses employed between the image I M, and the eye at K; consequently, the advantages derived from this eye-piece of Rhetia are two-fold; for, first, it gives an erect position to the object; and, secondly, it greatly diminishes the quantity of spherical aberration, and consequently produces a corresponding diffuseness; but the power of this eye-piece is simply that of one of the three lenses. To effect an increase of power at the same time that the two preceding advantages are preferred, various arrangements of three, four, and even of five lenses, have been made for the purpose of constructing a good terrestrial achromatic eye-tube; and the ingenuity of a Dollond and of a Ramden has been exercised successively to accomplish the desired object. These arrangements, so far as the diminution of spherical, and even of prismatic aberration was concerned, have been understood and explained; but the total power arising out of a number of lenses differently shaped, and placed at different distances relatively to each other, has not then been so clearly explained; and it should seem, from the manner in which such arrangement has been described by different authors, that the result has generally been ascertained practically rather than theoretically; which indeed must in some degree be the case whenever power, or, which is the same thing in effect, whenever actual focal distance, simple or compound, is to be accurately determined. We will not proceed upon the intricate plan of tracing the passage of a refracted pencil of rays through various lenses of different refractive qualities, and placed at various intervals, until they arrive at their last focus, or place of the image of a diffus radiant body; neither do we propose to follow the more familiar but less instructive method of simply giving in figures the radii and relative distances of three, four, or five lenses, that shall compose an achromatic eye-tube; but, avoiding each extreme, we shall describe the most improved eye-tube for erect position, upon the principles of a compound microscope, which instrument this tube really
really is of itself, and that of the best construction. We have referred an account of the theory of the compound microscope until we arrived at this article, on purpose to shew the intimate connection that it has with the refracting telescope, which, it will be seen presently, is also the case with a compound reflecting microscope, that composes a portion of both the Gregorian and Cassegrainian telescopes. First, let \( ab \) (Plate XXV, fig. 8.) be considered as an object to be magnified for examination by a compound microscope of the simplest construction: let \( df \) be the small object-glass, of which \( i \) is the focal point; then as the radiant object \( ab \) is at a small distance from the lens \( df \), beyond its focal or principal focus, the incident rays coming from it will converge slowly after passing through this lens, and consequently the conjugate focus at the other side of the lens will be remote, as at \( A B \), where an inverted image, \( A B \), of the object \( ab \) will be formed; and if the object is brought nearer to the focal focus, the image \( A B \) will recede with a linear amplification, for it always subtends the same angle at \( e \), the centre of the object-lens, that the object subtends at the same point; it is therefore obvious, that the linear amplification of the image, compared with the length of the object, will be as their respective distances from the object-lens, viz. as \( \frac{C}{e} \); and, consequently, the farther the image recedes, that is, the nearer the object is brought towards the focal focus \( i \), the more it will enlarge, which principle is the basis of both the magic lantern, and solar as well as lunular microscope. Let us call the ratio of the object to its image \( 1 : 5 \), as in our figure; then if \( DF \) be a double convex eye-glass, placed so that this image, \( A \), may be in its principal focus, the rays of light coming from it, now considered as a radiant, will, by passing through this lens, become parallel, in which state they will enter the eye at \( I \), and after converging to a new focus on the retina, will there make a picture of the image of the object, but in a reversed position. The principal pencil of rays coming from \( d \) and \( f \) of the object-lens, will meet at \( C \), the centre of the image, and diverge till they come to the eye-lens \( DF \), where they are made parallel, and where they define the size of the eye-hole in the cap of the eye-piece; while the angle of vision will be \( GEH = B \). In this situation, the image \( A \) is magnified by the eye-glasses inversely as its focal distance, that is, as many times as \( FC \) is contained in \( CE \); for the visual angle \( B \) \( EA \) subtended by \( B \) \( A \), exceeds the angle \( B \) \( e \) \( A \), subtended by the same line \( B A \); and, consequently, its opposite angle \( b \) \( e \) \( a \), subtended by the object, is in the ratio of \( C \) : \( CE \); and also, when \( CE = e \), in the ratio of \( C : e \); and the whole amplification will consequently be by compounding the ratios \( \frac{C}{e} \). But in this construction the field of view is small, though the power is great; and the chromatic effect of the prismatic aberrations, as well as the indistinctness and distortion of the figure of the object, are fully experienced. To do away these impediments to a pleasing view of the object, a second lens was introduced into the eye-piece, as \( MN \), in fig. 11. Plate XXIV, the original intention of which was, principally, to enlarge the visible area, or circle of vision, which it did effectually, while, at the same time, it diminished the power, and in some measure the spherical aberration, though the latter advantage does not seem to have been contemplated; and in this state the compound microscope remains in the present ordinary construction, one of the three lenses, \( df \), being the object-lens; the second being the amplifier \( MN \); and the third the eye-glass \( GH \). Now if we compare the compound celestial eye-piece in fig. 8, before described, as having the same power with the single imaginary lens \( E \) \( E \) in the same figure, we shall see that the only difference in the two arrangements is, that the image in fig. 11, is between the lenses, but in fig. 8, beyond them both. We have demonstrated the advantages of the combination in fig. 8, and have shewn that those advantages will continue, if the image be formed between the lenses; and also that making the distance between the glasses to exceed the focal distance of the eye-glasses, will bring the image into this intermediate situation, as is actually the case in the best achromatic telescopes, with both the celestial and terrestrial eye-pieces; particularly when the wire, or cob-web micrometer, is not used. If then we consider the object \( ab \) in fig. 11, to be the small or primary image of a distant object, formed in the focus of the achromatic object-glasses, the image \( AB \) will become the image of an image, or secondary image, in a contrary position; and this is the one actually viewed in the terrestrial tube of a telescope. Let us in the next place conceive the terrestrial tube to have only the three glasses that compose the arrangement of the compound microscope, and it is obvious that the image \( ab \) will be rendered as difficult, and as much enlarged in it, as the object \( ab \), of similar dimensions, would be in the like compound microscope. Thus have we a terrestrial eye-piece with an arrangement of three glasses, which magnifies greatly, and, so far as the pair of eye-glasses are concerned, is achromatic; but with respect to the object-lens \( df \), which might indeed have been made achromatic by a balance of contrary different powers, on Dollond’s plan of an object-glasses for a telescope, there remained room for improvement; and this has been effected by the same principle of division of the aberrations, that contributed to the improvement of the celestial eye-pieces with two lenses.

Plate XXVIII, fig. 15, shews a combination of two plano-convex lenses, that perform the office of one double convex lens in a compound microscope, or terrestrial eyetube, in which the lens \( A \) is placed next the object in a microscope, or image in a telescope, with its plane face outwards, and the lens \( B \) is placed at a distance from \( A \), that exceeds the focal length of either of the two lenses, and that is also greater than the distance between the two eye-glasses; but the proportions vary with circumstances. In the patent micrometrical telescope of Harris, in which the eye-tube is 7¾ inches long, the focus of the eye-glasses is 13; that of the field-glasses, or amplifier, 15, and the distance 24; while the lenses of the eye-end are both menisci; the outermost lens having a focus of 14, and the inner lens one of 12 or 1½, at a distance of 24. This novel form of a terrestrial eye-tube is found very good for a short telescope, and answers equally well for any variable length of focal distance of the patent object-glasses; and when the telescope has its focal length invariable, the difference between each separate pair of lenses may be varied at pleasure, and then the power of the whole combination will vary with the variations of this distance. In all other telescopes of the refracting kind, the two eye-glasses, as well as the pair of lenses at the remote end of the terrestrial tube, near the primary image, are all plano-convex, as we have shewn; and that combination which suits a short telescope, will generally suit a long one; but frequently that which is made purposely for a long one, will not suit a short one. A very good 12-inch terrestrial eye-tube, for a day and night telescope of two feet length, that we lately examined, has the proportions in the eye-tube somewhat different from telescopes with larger power; the eye-lens has a focus of 2 inches; the amplifier 3½, at a distance of 3 inches; and the third and fourth lenses are respectively
TELESCOPE.

respectively 3/4 and 3, at a distance of 4; the fourth lens being that next the primary image. The convex portion of all the four lenses is turned to the centre of the tube in all the terrestrial eye-pieces, except when Ramden’s, or the positive eye-piece, is substituted for the common or negative one. Another good day-eye-tube, of 3 inches length, has the first, or eye-lens, 1 1/2; the second, or amplifier, 2, at a distance of 2 1/2; the third, reversed as usual; and the fourth 2, at a distance of 3 1/2. When a great power is wanted, the celestial eye-piece does very well for the eye-end of the terrestrial tube; and it would be an advantage to every good telescope, if they were fitted for this purpose by an adapter, such as we shall have occasion to describe in our fifth section; for then each telescope would have a great variety of powers; and if the celestial eye-pieces were screwed into a separate tube, instead of a simple adapter, the power might be varied at pleasure, in any proportion, by altering the distance between the two separate pairs of lenses, as we shall hereafter shew has been done by the writer hereof, in his micrometrical measurement of distances in the last section of this article.

But to resume the consideration of our compound microscope (Plate XXIV. fig. 11.), we now see that the lenses CD and f, combine in such a way, that the object a, instead of being a little out of the focus of the single lens d, is a little way out of the compound focus of the two; and a circular piece of metal, perforated in the centre, called a diaphragm, is fixed in the tube, at the separate focus of the lens d, to exclude the coloured rays arising from the prismatic dispersion of this lens; and then the rays of least dispersion, that pass through this hole, enter the lens CD near its centre, and, therefore, have afterwards but little spherical aberration; on which account it is obvious, that the image in the microscope, or secondary image in the telescope, will be distinct and colourless; and it is very extraordinary, that while improvements are daily meditated in every mechanical art, the addition of a second lens, to diminish the aberrations, is not yet made to the object-end of the compound microscope, though the same thing has been done in the terrestrial eye-tube of an achromatic telescope, which not only answers precisely the same purpose, but is in fact itself an achromatic compound microscope.

After having gone through our explanation of the practical forms of both the double and triple achromatic object-glaafs, and also of the various achromatic eye-tubes, which we have endeavoured to render intelligible to young opticians, we shall finish this long section by giving a short account of the different arrangements of the glaafs of an achromatic telescope depending on these various forms, as we have already done with respect to the old telescopes, represented by figs. 1, 2, and 3. Plate XXV. Fig. 4. shews the arrangement of a double object-glass in conjunction with a negative eye-piece of two lenses, with the image between them, the power of which is simply the compound focal length of the object-glass A, divided by the compound focal length of the eye-lenses B and C. This arrangement is that of the best achromatic telescope with a celestial eye-piece, and, being shorter than the terrestrial telescope, is more conveniently managed. When the eye-piece has a flip of graduated mother-of-pearl, contrived by Cavallo, and divided by Mr. Barton, at its diaphragm, it makes an useful micrometer for measuring small angles; and when this eye-piece is taken out, the wire or cobweb micrometer may be screwed in, instead thereof; and then, if the telescope is of a good fize, an angle within its reach may be measured with great accuracy. With this celestial telescope the object is inverted, and the light will be directly as the area of the aperture, and inversely as the magnifying power. Fig. 5. gives the arrangement of the lenses in a terrestrial achromatic telescope with a triple object-glass; in which A is the object-glass, B the eye-lens, and C the amplifier, or field-lens of the eye-piece BC; D is the third lens, that diminishes the aberration of the fourth lens E, which, in a compound microscope, is called the object-lens. This is considered the best construction of a terrestrial telescope. The power is equal to the compound focus of the object-glass, divided by the compound focus of the eye-piece BC, when the quotient is multiplied by the first part of the microscopic power of the lenses E, D, which part will vary with the distance between the two pairs of lenses. The arrangement in fig. 6. differs from that in fig. 4. only in the eye-piece, which has here the image beyond it. Also the arrangement in fig. 7. differs in like manner from that in fig. 5.; and what we said respecting power and light of those lenses, is equally true of thefe. The eye-pieces of the telescopes in figs. 6. and 7. are those of the wire and cobweb micrometers.

3. Theory of cata-dioptic Telescopes.—When the image of a distant object is formed in any telescope entirely by reflected rays meeting at a focus, this image is properly cata- or retro- objective (from the Greek word κατα-τοπικός, speculum); but when it is formed partly by reflection and partly by refraction of the rays, in coming to a focus, it is then cata- or dichroic, that is, both catoptric and dioptric; and as the image cannot be viewed without an eye-glass, all reflecting telescopes are promiscuously called cata-dioptic.

Before we describe any of the different constructions of a telescope where reflection is concerned, we will explain the principles on which the catoptric theorems are founded, and give a small table of those theorems that determine the focus under different circumstances, as we have already done with respect to the dioptric theorems; at the same time referring our readers for farther information on this subject to the articles CATOPTRICS, MIRROR, and SPH̄CEM. In Plate XXVI. fig. 8. Astronomical Instruments, let the curve GE be considered as a portion of a convex speculum, formed from the centre C, and CA or CE its radius; then suppose DA to be a ray of light proceeding from D, the radiant point, in the axis of the speculum, and falling on the point A, from whence it is reflected in the direction of the line AC, tending in a contrary direction to a point F, its virtual focus, in the axis of the speculum behind the vertex E; then put DE = d; CA or CE = r; CF = z; and FE = f + z = r = CE. Now if we suppose the point A to be very near to E, a point in the axis, the angles at D and C will become very small, and will, consequently, have the same proportion to each other as their opposite sides AC and AD have; but AC = AE, and DA may be taken = DE without any sensible error; hence there will be this analogy, ADC = ACD = CE = DE; d = r. Produce now CA to I, and IA will be perpendicular to the face of the speculum in A, the point of reflection; and, therefore, the angles DAI and IAC will be equal. But DAI = DAC, and IAC = CAF, as being respectively opposite, therefore DAC is equal CAF; also DAC = D + ACD + ACD = r + d, and consequently the angle CAF = r + d. Again, in the triangle CFA, when the point A is near the axis at E, the angles at A and C will be very small, and will have the same proportion to each other as their opposite sides FC and FA, and the angle FCA = FCA = FC = FA; but in this case FA may be esteemed = FE, and therefore we have FAC = FCA = FC = FE = z = f. But we have seen that the angle at C is as DA or DE, that is, as
$\alpha$, and also the angle $\angle FAC$ as $r + d$; therefore we have as $f: z = d: d + r$; and by composition of ratios, $f + z = f: 2d + r : d$; but $f + z = r + f + z = 2d + r : d$; then by multiplying the extremes and means together, we have the equation $dr = 2df + fr$, and dividing by $2d + r$, there results the theorem $\frac{dr}{2d + r} = f = \frac{EF}{EF}$. This may be considered as the fundamental theorem in catoptrics, from which the focus may be determined in any speculum, concave, convex, or even plane, whether the rays fall upon it diverging, parallel, or converging; and from a due variation of the symbols and signs, as the case may require, we have all the variety of theorems for finding the focus contained in the following table.

**Table for finding the Focus of Rays reflected by any Speculum.**

<table>
<thead>
<tr>
<th>Rays</th>
<th>Convex</th>
<th>Concave</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diverging</td>
<td>$\frac{dr}{2d + r} = f.$</td>
<td>$-\frac{dr}{2d - r} = f.$</td>
</tr>
<tr>
<td>Parallel</td>
<td>$\frac{r}{2} = f.$</td>
<td>$-\frac{r}{2} = f.$</td>
</tr>
<tr>
<td>Converging</td>
<td>$-\frac{dr}{2d + r} = f.$</td>
<td>$\frac{dr}{2d - r} = f.$</td>
</tr>
</tbody>
</table>

To illustrate the utility of this little table, let it be required to determine the respective foci of two specula, both ground and polished, on tools of 30 inches radius, when the radiant object is placed at 300 feet distance, one speculum being convex, and the other concave? In the first place, as the distance is less than infinite, the rays will come diverging from a luminous point; and, therefore, with respect to the convex speculum, we must use the theorem $\frac{dr}{2d + r} = f$, which in figures will read thus, $\frac{300 \times 2.5}{2 \times 300 + 2.5} = \frac{750}{602.5} = 1.245$ feet, or 14.94 inches for the required focus; but for the concave speculum, the theorem $-\frac{dr}{2d - r} = f$(or $-f$, because the focus and centre of the curve are on the same side of the speculum) will give us the numbers, viz. $\frac{300 \times 2.5}{2 \times 300 - 2.5} = \frac{750}{597.5} = 1.255$ feet, or 15.06 inches for its focal distance; and in like manner may the proper focus be determined for any other radius and distance, however the rays may be directed when they fall upon the speculum; whenever they come converging or diverging from a first to a second speculum, the focal point, real or virtual, must be considered as the radiant, and its distance reckoned accordingly.

These theorems, however, imply that the speculum is already made, whereas in many practical cafes, the focus is first affixed, and the proper radius of convexity or concavity is required, or, which is the same in effect, the radius of the tool is required that shall be proper for forming the requisite curve. For instance, let it be required to form a tool of such a radius, that an image of any very remote object may be formed, by a speculum ground and polished to its dimensions, at the distance from its reflecting surface of just 18 inches? In this case, the rays must be considered as parallel, because the object is remote; and, indeed, it is always for a remote object that the curve of a large speculum is formed; consequently the theorems $\frac{r}{2} = f$, and $-\frac{r}{2} = f$, or $-f$, will be suitable for the required purpose, in both which $2f = r$; therefore, $18 \times 2 = 36$ will be the proper radius of either the convexity or concavity of the tools to be used. If the ray had been diverging, and the focus affirmative, or behind the speculum, for a convex speculum the theorem arising from transformation would have been $\frac{2df}{d + f} = r$; and for a concave $\frac{2df}{d - f} = r$; but in the case of a negative focus, or focus before the speculum, the former would have been $\frac{2df}{d + f} = r$, and the latter $\frac{2df}{d - f} = r$. In like manner, the distance may be determined from the radius and proper focus being given; for supposing the focus affirmative, with a convex speculum, the transformed theorem for diverging rays will be $\frac{rf}{2f + r} = d$; and with a concave $\frac{fr}{2f - r} = d$: but when the focus is negative, the former will be $\frac{-rf}{r + 2f} = d$, and the latter $\frac{fr}{r - 2f} = d$. Hence, when any two of the terms $f$, $r$, and $d$ are given, the third may be readily determined.

Thus, in the case of a convex speculum with diverging rays, if we put $d = r$, we shall have $\frac{r}{3} = f$; when $d = \frac{r}{2}$, then $\frac{r}{4} = f$; when $d = \frac{r}{4}$, then $\frac{r}{5} = f$; and when $d = \frac{r}{6}$, then $\frac{r}{6} = f$: from which results

In order to shew what proportion the length of an image, formed in the focus of reflected rays, will bear to the length of...
of the object which it represents, let DE (fig. 9.) be a portion of a convex speculum, C its centre, V the vertex, OB an object, and I its image; and let it be required to find the proportion that the object, or line BO, bears to the image, or line IM. From the centre C, let the perpendicular CA fall on the object or radiant; and from its extreme points O, B, draw OC and BC, to meet the speculum in the points D and E; and do the same in fig. 10, where the curve DE represents a concave speculum; then the line AV will be the axis, in some part of which the rays proceeding from the points O and B will meet, and the points of intersection will be the foci respectively. From O, let a ray OV pass to the vertex of the speculum, so as to make the \( \angle FVA = \angle OVA \); then will VF be the reflected ray, which tending to the point I, in the axis CO, shall there form the image of the point O of the radiant. In like manner, the ray BV will be reflected in the direction VG, and intersecting the axis CB in M, will there depict the point B of the said radiant; and thus all the intermediate points lying between O and B will be represented between I and M, and a complete image of OB will be formed at IM. If we suppose the object at a great distance, and consequently small, the arc \( ED \) of the speculum will be very minute, and not sensibly different from a right line, and consequently will be paralleled to the radiant BO, because CA is perpendicular to both BO and ED. Also, since the distances OD, AV, and BE, are very nearly equal, from their contiguity, it is plain that the focal distances DI, VA, and EM, will also be nearly equal; and, therefore, the image IM will be very nearly a right line, and parallel to the radiant OB, as well as perpendicular to CA.

Now from the nature of reflection, we have \( \angle BVA = \angle AVG = \angle aVM \); therefore, \( \angle OVA = \angle aV = aV \); and the angles at A and a are both right angles; therefore, \( VA : V a = AO : aI \). For the same reason, \( VA : V a = AB : aM \); and \( VA : V a = OA + aB : aM \); \( OB : IM \); or, in words, "the distance of the object is to the distance of its image, from its vertex V, as the length of the object is to the length of the image." From this analogy here deduced, it is easy to form theorems, that shall determine either \( d, f \), or the proportion \( O : I \), when \( O \) is the length of the object and \( I \) of the image, when the two others are given. For we have given

\[
O : I :: d : f, \text{ and consequently } \frac{1}{O} = \frac{f}{d}; \text{ but our fundamental theorem was } \frac{d}{O} = \frac{d}{2d + r}, \text{ and so } \frac{d}{2d + r} = f, \text{ consequently } \frac{1}{O} = \frac{1}{2d + r}; \text{ and for a concave, } O - r = 1f; \text{ and for a convex speculum, the theorem will be } \frac{O - r}{21} = d; \text{ and for a concave, where } r \text{ is negative, it will be } \frac{1 - r}{21} = d. \text{ But if the focus be required to be negative in a convex speculum, the theorem will be } \frac{r - O}{21} = d; \text{ and in a concave, where } r \text{ and } f \text{ are both negative, it will be } \frac{O + r}{21} = d. \text{ If } r \text{ be required in a convex speculum, when } d \text{ and } O : I \text{ are given, the theorem will be } \frac{21d}{O - 1} = r, \text{ and in a concave } \frac{21d}{1 - O} = r; \text{ but if the focus is required to be negative, the first will be } \frac{-21d}{O + 1} = r, \text{ and the second } \frac{21d}{O + 1} = r.

Lastly, when \( d \) and \( r \) are given, to find \( O : I \), we shall have this analogy for a convex speculum: \( I : 2d + r : r \); and for a concave, \( O : I :: 2d - r : r \); but if the focus be negative, for a convex, it will be \( O : I :: 2d - r : r \); and for a concave, \( O : I :: 2d - r : r \); so that, as we have said, when any two of the three terms are given, the other may be determined by calculation. By way of exemplification, let it be required to find the radius of a concave speculum, that shall make the image of an object, placed at 100 feet, as \( 1 : 60 \), in front of the speculum. Now if being in this case negative, we have the theorem, as before specified,

\[
\frac{21d}{O + 1} = r, \text{ or, in figures, } \frac{21d}{60 + 1} = \frac{200}{61} = 3.28 = r, \text{ nearly; or if } r \text{ be given, and } d \text{ required, the theorem } \frac{O + 1r}{21} = d, \text{ or } \frac{50 \times 3.28 + 1 \times 3.28}{21} = \frac{200.08}{2} = 100.04 = d; \text{ and if } 3.28 \text{ had been the exact radius, the distance would have come out exactly 100. If the image and object had been equal, they would both have fallen exactly at the centre of concavity of the mirror, which coincidence affords a ready method of determining the radius of concavity of any speculum, by means of a luminous point used as an object, and brought so that its image will exactly coincide with it. It is hardly necessary to add here, that a concave speculum forms an inverted and magnified image; and that a convex one makes it erect, and at the same time diminishes it. We have before shown how the aberration of the rays of light may be calculated, when reflected to a focus by a speculum of a spherical figure, when the rays are parallel before they suffer reflection; and it has been demonstrated, that for such rays a parabolic curve is the belt suited for correcting such aberration, particularly when the image is formed by only one reflecting surface; but when there is a second or small speculum, either concave or convex, employed in forming a secondary image, or in asfifting to form the primary one, a parabolic curve will not be the belt for correcting the aberration of the rays; because each speculum will have its own aberration; and the practical optician can employ his skill in producing suitable specula for counteracting each other's errors, with respect to the united effect of their separate aberrations, better than the calculating theorist can pretend to direct; for the moment he screeches his eye-tube alternately out and in, beyond and short of distinct vision, he knows the nature of the curves of his specula, and whether the indistinctness arising from aberration is the consequence of too much or too little curvature at the vertex of the large speculum, and can make the final alteration accordingly. This practical dexterity, arising out of experience, supercedes the necessity of tedious mathematical calculations, where some part of the data must necessarily be assumed; and it is much to be wished, that practical men, who have excelled
The circumstances that led to the construction of a reflecting telescope did not arise out of chance, as is supposed to have been the case with the dioptric, but out of the difficulty of avoiding the indistinctness produced by aberrations of both kinds; and the first arrangement that would probably occur, would be that of a speculum opposed to the eye of the observer, whose head in that case would intercept the incident rays, and prevent their falling on the speculum, unless it were made of an unmanageable diameter. To avoid this inconvenience, Gregory, who was the first to undertake the arduous task of a new construction, devised the expedient of opening a hole in the centre of the large speculum, sufficiently large to admit of the rays that came reflected a second time from a smaller speculum without a central perforation; it would naturally occur to him, that if this second speculum was not larger in diameter than the central hole of the large speculum, no incident light would be intercepted by it, when the rays came parallel, but what would have passed through the central hole of the speculum. This consideration brought the eye to the same end of the tube in which the large speculum was placed, and thus freed the aperture from all obstacles to the free admittance of light; but whether the small speculum at first tried was a plain one, or concave, is of no importance to ascertain; it is sufficient for our purpose to know, that a concave one was ultimately adopted, and probably from the property which it possest of varying the magnifying power to a considerable extent.

We have already said that Gregory's construction of the reflecting telescope is the most ancient, and indeed continues to be the most common, even at this time, on account of the convenience attending its use, and therefore we will begin with an explanation of its theory. Plate XXVII. fig. 1. Astronomical Instruments, represents a section of this instrument as it was originally made, and fig. 2. is a representation agreeably to its improved modern construction; in both which we shall use the same letters of reference to the corresponding parts. A B C D, in each figure, denote the tube of wood or brass in which two concave specula are contained; the large one, B D, is perforated at the centre, and placed contiguous to the interior end of the tube, but in such a way as to have a little play when pressed by a circular spring behind it; E F is the small speculum, which is of shorter radius than the speculum B D, and has its centre placed exactly in the centre of the tube opposite the central aperture in the large speculum, and is so adjusted by the screws behind it, that the image of the large speculum forms a concentric circle on its reflecting surface, when viewed by an eye situated in the central hole of the large speculum. In this instrument, as in the refracting telescope, it will be most convenient to describe first the formation of the primary image of a diaphant object in the body of the tube, and then the microscopic means applied for rendering this image visible in an apparently magnified state; for in truth there is actually a compound reflecting microscope made use of as a constituent part of this instrument, in like manner as the terrestrial tube of a refracting telescope of the best achromatic construction, is in itself a compound reflecting microscope.

In the first place, agreeably to the laws of catoptrics, which we have explained, if we consider a b and c d two rays of light coming from the centre of a diaphant arrow in a state of divergence approaching to parallelism, and impinging on the large speculum at the points b and d near the remote edges of the speculum, and at equal distances from its axis, they will be reflected inwardly so as to meet at the point e, in the common axis of both the specula, and will form the image of the central point of the arrow; and in like manner, any number of rays proceeding from the opposite ends of the said arrow may be conceived to fall on the speculum, and to be reflected to the points b and i, and to all the intermediate points, so as to form a perfect image b e i in an inverted position, because the rays which enter the tube from the right-hand end of the arrow, will after reflection cross the axis, and form the left-hand end of the image, and vice versa. When an image is thus formed, if it could be viewed, under sufficiently favourable circumstances, by an eye placed in the vertex or central aperture of the large speculum, it would subtend the same angle as the object itself seen from the same situation, as we have already demonstrated; and therefore the length of the image will bear the same proportion to the length of the object which it represents, as its distance from the eye, or vertex, is to that of the object; so that the longer the radius of the speculum which forms the image, the more distant, and consequently the longer will this image be, as compared with the object; and for the same reason, the nearer the object, the longer will its image be, until the situation is at the centre of concavity of the speculum, where the object and image will coincide, and appear of like magnitude, but in contrary positions.

This formation of the primary image being understood, we must in the next place consider it as a real microscopic object, placed somewhere between the face of the large speculum, and its centre of concavity, which situation will always depend on the distance of the real object itself, or, which is the same thing, on the degree of divergence of the incident rays coming from the object. Now if the small speculum be so placed as to have this primary image, or microscopic object, in its focal point, the rays coming from it would be reflected towards the large speculum in a parallel state; and passing through the central opening of the large speculum, would never converge so as to form a secondary image, in which case the conjugate focus would be said to be infinite; and if the said primary image were nearer to the small speculum than its focal focus, the reflected rays would diverge so as not to reach the central hole of the large speculum at all; but if the distance of the primary image b e i exceeds the focal focus of the small speculum E F, which is at the point f, then the reflected rays coming from the primary image will converge to a conjugate focus somewhere in the axis, and form a secondary image, the magnitude of which will increase with its distance from the primary image, which we now consider as a real microscopic object. The place where this secondary image will fall, will depend on the distance of the primary image from the solar focus of the small speculum; and a small change of this distance will cause a great corresponding change in the place of the secondary image, or conjugate focus; so that an adjustment for a small forward and backward motion of the small speculum, by means of a screw at the end of a long rod placed parallel to the tube, and reaching to the eye-end, will suffice for regulating the place where the secondary image shall most conveniently fall to be viewed by an eye-glasse. The secondary image has its position reversed, as it regards the primary one, and is therefore in the same position as the object itself, or what is usually called erect, in opposition to inverted. This secondary image was originally made to fall within the tube, at a k, in the focus of the eye-glasse G H, through which it may be viewed by a small hole at I, where the visual angle...
G I H is now considerably enlarged. In order to explain the theory of this reflecting compound microscope, composed of the small speculum EF, and eye-glasses GH, more particularly, which we purposely omitted to do under the term Microscope, let us suppose a ray of light proceeding from the end b of the microscopic object, or primary image b e i, and falling on the central part of the small speculum at g, it will return reflected from this point, so that the angle of reflection on the other side of the axis or line g e f, will be equal to the angle of incidence on this side, and will therefore return in the line g e i, to the place of the conjugate focus, where the point b will be depicted at l: also a ray coming from the point i of the same primary image, and falling on the point g, will be reflected in a similar manner along the line g b k, and will form the point i, at k, in the secondary image, which we have represented by a dotted line. Now as the primary and secondary images are subtended by the same angle b g i, or k g i, at the vertex g of the small speculum, agreeably to the laws of optics, it is evident that the linear magnitudes of these two images will be directly as their respective distances from g, the vertex of the small speculum; therefore, as often as the distance b g is contained in the distance g i, or the distance g i in the distance g l; so often will the length of the secondary image k l, exceed the length of the primary one b i. But this secondary image k l is viewed through the eye-glasses GH, under the visual angle GI H, and is said to be again magnified thereby; let us next see what is the amount of this amplification; we have already said that an eye at the vertex g of the small speculum, would view both the primary and secondary images under the same visual angle b g i or k g i; but by an eye at I, the visual angle is GI H = k K l, because k K is parallel to H I, and k K to G I; and k l is the common subtense of both angles; consequently, as the distance L k, or the focus of the eye-glasses G H, is to the distance of L g, or distance of the small speculum from the secondary image; so is the apparent magnitude of the secondary image, or visual angle to the eye at g, to the primary image, with the eye at I; and if the distance g l be that at which an object may be best seen by the naked eye, the whole power of magnifying of such microscope will be \[ \frac{g l}{k l} \] provided that b i be considered as a real object under microscopic observation. But in a telescope, the size of b i has a reference to the distance of the object which it represents, and this circumstance must be taken into consideration in estimating the power of the Gregorian telescope. When the eye is placed at e, the vertex of the large speculum, we have said, that the object and its primary image are seen under the same visual angle; therefore, wherever the primary image may fall in the line of the axis, the angle b o i will be to the angle G I H, or k K l, as the object seen by the naked eye is to its secondary image, as seen through the eye-glasses, and consequently the latter, divided by the former, will give the power. But the visual angles b o i and k K l are to each other in the compound ratio of \[ \frac{e g}{g l} \times \frac{L g}{L K} \] which formula, expressed in measured dimensions, will be more convenient for ascertaining the whole power of a Gregorian telescope, than the ratio of the visual angles, which would require previous calculation. For instance, let o e, the distance of the primary image from the great speculum, be given = 24 inches; and e g, the distance of the same from the small speculum, be = 3.3; also let L g, the distance of the secondary image from the small speculum, be = 25.5, and L K, the focus of the eye-glasses, be = 2.3; then we shall have, according to our formula, \[ \frac{24}{3.3} \times \frac{25.5}{2.3} = 80.6 \] or, which is the same thing, \[ \frac{24 \times 25.5}{3.3 \times 2.3} = 80.6 \] for the power of such a telescope, when directed to an object at such a distance as shall make the primary image fall as we have taken it. For objects very near, the focus of the large speculum will be long, and consequently the primary image will approach the small speculum as the distance decreases; for which reason, the magnifying power will increase with the diminution of distance, and vice versa; so that the power with parallel rays, or when the telescope is used for celestial purposes, will be the smallest possible, and yet this is what is usually called the power of the telescope, which circumstance shows the imprudence of taking the power of a large telescope from a measure of a near terrestrial distance, which mode has been practised by eminent astronomers, and recommended by men of science. If, however, a correction is applied for the want of parallelism in the incident rays, as we shall have occasion to do presently, then the power may be as accurately obtained at a shorter as at a longer distance. In the old construction, which our fig. 1. represents, the piece of bent b raff at c, which supports the small speculum, is acted on by the long rod j C, that has a milled nut at l, and a screw cut on the end C, that draws the projecting part N, of the piece c, along a slit made in the tube, while a contrivance in the cock M prevents the rod M N from advancing or receding as the rod revolves. Hence the eye-glasses G H remains fixed, and the adjustment for distinct vision is made by the rod M N moving the small speculum to its proper distance from the primary image b i; and in this way the secondary image may be made to rest in any given situation beyond or short of the point L, so that various eye-glasses may be used with the same speculum in succession; or different small specula may be used with the same large one, from which changes a variety of powers may be had with fixed eye-glasses; but if the eye-glasses be inserted into a smaller sliding tube, there will be a third method of varying the power, by bringing the secondary image into the sliding tube out of the body of the large tube, so as to increase the distance L g, which is one of the factors of the dividend in our formula. Thus, whatever may be the arrangement of the specula, eye-glasses, and distance of the primary image, when any three out of the four terms of the formula are given, together with the whole power, the fourth may always be had by a simple calculation, which is a matter of great convenience to the maker. If, for example, we take the power 80.6 = p, and the radius of curvature of the large speculum = 48 inches, in which case the primary image with parallel
ary image, now considered as a real object, but that the field of view is thereby circumscribed into a small area. For these reasons, the Huygenian eye-piece, already explained, was disfigured for the single eye-gla$.s, which substitution left little more to be done, in the way of the improvement of the Gregorian telescope, except what related to the construction of the speculum, which have now been brought nearly to a state of perfection, as we have explained, at some length, under our article Spectulum. We have introduced fig. 2. for the purpose of explaining more clearly, than we could by a mere verbal description, the plan of the Gregorian telescope in its most improved state, in which, we repeat, the same letters indicate the same parts as in fig. 1. In this figure we have made the pencil of rays $a$ and $c$ to consist of each of three lines, for the purpose of shewing how the image is formed at the points of convergence after reflection, and also how the inversion of the image is produced by the crossing of the pencils before they converge to a point at each end of the image. It may also be seen how the rays pass through the interior eye-gla$.s, before they form the secondary image between the two glasses, as in the achromatic astronomical telescope, thereby constituting this image a cata-dioptic one, which before was a catoptric one, according to our definition. The Huygenian eye-piece is peculiarly adapted for the Gregorian telescope; and when the speculum has its curves fo adapted as to counteract each other’s aberrations, as we before recommended, and are also well polished, as well as of suitable metal, a very high power may be applied, and the light by reflection will be to that by refraction alone nearly as $5:8$, where the apertures are equal; but as a reflector is capable of having a much greater aperture than any refractor that can be constructed, it will have a proportional advantage in the essential quality of illumination combined with power, on which union its excellence depends. It will not be necessary to repeat here what we have said above respecting the manner of determining a single eye-gla$.s, equal in power to the combined eye-glasses in the Huygenian eytube; but it may be proper to mention here, that such a gla$.s, when determined, must be substituted for the compound eye-piece, in computing the power of the telescope according to our preceding directions. The diaphragm that precludes the straggling and extraneous rays from coming to the eye is put where the secondary image is formed, and the aperture at the eye is obliged to be small in this construction of a telescope, to prevent any other light being admitted into the eye than what is reflected from the small speculum, and is necessary for the formation of the secondary image. When the diameter of the small speculum, and also the exact situation of the primary image, are known, the aperture at the eye, that shall admit the principal pencil, may be exactly determined by the subjionded analogy: viz. as the distance of the small mirror from the secondary image is to the focal length of the nearest eye-gla$.s; so is the diameter of the small speculum, to the necessary aperture at the eye. And to find the proper diameter of the small speculum, or central aperture of the large one, the proportion will be, as the distance of the primary image from the large speculum, is to its distance from the small one, with incident parallel rays; so is the diameter of the large speculum, to the diameter of the small one, or of its own central aperture; and when this proportion is preferred, all the reflected light will enter the small tube that contains the eye-glasses, and all the extraneous light not falling on the large speculum, if any, will be excluded. Lastly, though the field of view be required to be equal to a given visual angle, such as that subtended by the diameter of the sun, this will depend on the power of the instrument, which for this purpose must be limited, as in the following example: let a reflecting Gregorian telescope of four inches diameter of the large speculum, and 17.5 inches focus, with a hole in the centre 1.1 diameter, (which is considered in practice a good proportion,) be required to have a field of view just $32'$, when the focus of the eye-glasses is two inches? The thing required is, that the enlarged secondary image of the sun should just fill the aperture in the centre of the large speculum. The size of the primary image of the sun depends on the focal length of the large mirror, and must first be found: it has been ascertained that, in the focus of a speculum (or lens) of six inches focal length, the image of the sun is $0.0586$ diameter, when he measures $32'$; therefore, as it will be proportionably more in a longer focus, say as $6:0.0586:17.5:1.1269$; also, as often as this image $1.629$ is contained in $1.1$, the diameter of the hole in the large speculum, which quotient is $=6.75$, so much does the small speculum magnify the primary image, in converting it into a secondary one of 1.1 diameter. Again, if we divide the focus of the great speculum 17.5, by 6.75 - 1, we have 3.04, the distance of the primary image from the small speculum, which is somewhat more than its solar focus; and also if we divide 4, the diameter of the large speculum, by the same (6.75 - 1), we shall have $0.695$ = the diameter of the sun’s image on the face of the small metal, while the secondary image will just cover the hole of the large speculum, as required. Now, lastly, to find what is the power of the telescope under these limitations, we have $17.5 \times 6.75 = 118$ for the first part of the power; then $\frac{118}{2} = 59$ = the whole power, when 2 is the focus of the single eye-glasses. If the length of the focus of the principal speculum were increased to 30 inches, or even to 30 feet, while the aperture remains as before, no advantage would be gained in this construction from such length; for in the case of 30 inches focus, the primary image would be $2.795$, and the power of the small speculum only $3.93$, while the distance of the primary image from the small speculum would be 10.24; the diameter of the image on the face of the small speculum 1.36; and the magnifying power $\frac{30 \times 3.93}{2} = 59$, as before. There would, indeed, be this disadvantage, that, as the small speculum has an increased radius here, its diameter will necessarily be so much augmented, as to intercept several of the best rays of light, which are those that fall near the centre. The opinion, consequently, that a Gregorian telescope will be improved by having a long focus of the great speculum, with the same aperture, is erroneous. When two reflecting telescopes perform alike, as to light and distinctness, the square square roots of the diameters of the specula must be as the cubes of their focal points respectively. There can always be more power got by the small speculum and eye-glasses, in even a short tube, than the aperture will bear. The theory of Cañegrain’s telescope is very similar to that of the Gregorian, the principal difference being that, in Cañegrain’s, the small speculum is convex instead of concave. When the radii of the two specula and the eye-piece are respectively the same in each construction, the powers will be the same, though the apparent position of the light image, which we have shown to be erect in the Gregorian, is inverted in the Cañegrainian construction; for on examining fig. 3, which explains the course of the rays in Cañegrain’s telescope, it will be seen that the incident rays $a$ and $c$, after being reflected from the large speculum,
are prevented from coming to a point at the virtual image \( b_i \), behind the small speculum, in consequence of its interposition, but are again reflected towards the eye in a state of less rapid convergence, till, falling on the lens \( \mathbf{G} \mathbf{H} \), they are refracted to a focus at \( \mathbf{L} \), and form the real image \( K \mathbf{L} \), which may be considered as the primary image, and is, therefore, not in the same position as the secondary image, which is formed in the Gregorian telescope after the rays have crossed each other. When the rays fall on the large speculum, they are reflected in a state of convergence towards the small speculum, because coming from a distant object; and they enter the tube either parallel or diverging, accordingly as the object is more or less distant; but they fall on the small speculum converging, so as not to become quite parallel after the second reflection, but slowly converging; and the quantity of convergence will depend on the distance of the virtual, or what may be called imaginary focus, or image \( b_i \), from the small speculum \( \mathbf{E} \mathbf{F} \), which is here between \( f \), the focal distance, and the convex speculum; whereas in the Gregorian instrument, the focal distance \( f \) is between the concave speculum and image \( b_i \). In both constructions, \( a \frac{g}{e} \times \frac{L \mathbf{G}}{L \mathbf{K}} \) is the measure of the power; and it is evident that the part \( \frac{g}{e} \) is the same in both; but it is not equally clear that \( \frac{a}{e} \) is the same, or in the same ratio in both.

The distance \( e \) between the two specula is less in Caffegrain's instrument than in the Gregorian, by twice the focal distance of the small speculum, and by much may the principal tube be shorter; therefore, it remains to be proved that \( g \frac{e}{g} \) is to \( g \frac{o}{g} \) in one telescope as \( g \frac{e}{g} \) is to \( g \frac{o}{g} \) in the other, though differently posited. In order to prove this analogy, let \( \mathbf{H} \mathbf{D} \) (Plate XXVI. fig. 11.) be a concave speculum, and \( \mathbf{E} \mathbf{C} \) a convex one, both described with the same radius \( \mathbf{C} \mathbf{D} \), and on the common axis \( \mathbf{B} \mathbf{C} \); and let the point \( \mathbf{N} \) intersect the radius, so as to become the focal point of each speculum, one really, and the other virtually. Let \( \mathbf{F} \) be a radiant point, from which the ray \( \mathbf{F} \mathbf{H} \) is incident on the concave mirror at the point \( \mathbf{H} \), or to which the ray \( \mathbf{K} \mathbf{E} \) incident on the convex speculum is tending; then both these rays will be reflected from their respective specula to the same point \( \mathbf{B} \) in the axis, and will pass in the same line \( \mathbf{F} \mathbf{B} \). Again, let \( \mathbf{CF} \) be an object, and the image thereof \( ab \), formed by the concave, will be equal to the image \( \mathbf{A} \mathbf{B} \) made by the convex.

This may be proved from our preceding theorems for convex and concave specula respectively, viz., \( \frac{dr}{2d + r} = f \) and \( \frac{dr}{2d - r} \), or \( \frac{dr}{r - 2d} \), when all the signs are changed.

For as \( d = \mathbf{F} \mathbf{C} \), \( \mathbf{C} \mathbf{B} = f \) in the convex; so in the concave, let \( \mathbf{F} \mathbf{D} = i \), and \( \mathbf{D} \mathbf{B} = \delta \); and then we have in the former \( \frac{d}{r} : \frac{d}{r} = \frac{d}{r} + \frac{r}{r} = \frac{d}{r} + \frac{r}{r} \), and in the latter \( \frac{i}{r} : \frac{i}{r} = \frac{d}{r} + \frac{r}{r} \). But \( i = d + r \); therefore \( \frac{i}{r} = \frac{d}{r} + \frac{r}{r} \); whence \( \frac{i}{r} = \frac{d}{r} + \frac{r}{r} \)

consequently \( \frac{d}{r} = \frac{d}{r} : \frac{d}{r} \), that is, \( \mathbf{C} \mathbf{F} : \mathbf{C} \mathbf{B} = \mathbf{D} \mathbf{F} : \mathbf{D} \mathbf{B} \); also the object and image are to each other in the same ratio with each speculum; and, therefore, since the object is the same in both, the image will be the same also, or \( \mathbf{A} \mathbf{B} = \mathbf{ab} \), which was to be proved. After having given this demonstration, it will be unnecessary to shew how the powers may be varied at pleasure, agreeably to the variation of the radii of the specula and lenses that compose the eye-piece, all which we have just explained with regard to the Gregorian arrangement. As the instrument which is the subject of our present consideration inverts the objects to which it is directed, it is seldom used but in astronomical observations, for which it is peculiarly adapted, seeing that it is capable of having greater power, with the same length of tube, than any other telescope that has been yet invented; though with a terrestrial eye-piece, it might be used for the examination of terrestrial objects.

While we are writing our present article, we have before us a Caffegrainian telescope by Tully, of 36 inches of tube, and 6\( \frac{1}{2} \) aperture, that will shew Saturn or Jupiter, with their moons very well defined, with a power of 440; and that will distinctly define the words of a page in this Cyclopaedia, at the distance of 210 yards with a power of 295.

The make of this instrument has constructed two pairs of telescopes, one of each pair a Gregorian, and the other a Caffegrainian, so as to match each other exactly in dimensions, powers, and quality of the metals and glases, in order to ascertain if one construction has any advantage over the other in quantity of light, under exactly the same circumstances; and though several scientific gentlemen, besides the author of this article, have examined and compared different objects as seen successively by each of the two telescopes of both pairs, yet not the least difference can be discerned by any observer. When the left glimmering of day-light remained, the vanishing object ceased to be visible with each like telescope at the same time, as nearly as could be ascertained, and that with both pairs, though they are constructed with dimensions greatly different the one pair from the other, and vary consequently in their powers and quantity of light. This experiment originated out of captain Kater's paper on this subject, which was published in the Philosophical Transactions of London, in the year 1813; and we have no hesitation in saying that the quantity of illumination is the same in both constructions, when the dimensions and qualities of the constituent parts are perfectly similar. Whatever may be the dispersion of light at the point of crossing of the rays, in the Gregorian construction, when the dispersed rays are returned from the second speculum, they are collected again, it should seem, without loss, certainly without apparent diminution of light. This conviction we put on record, not out of a spirit of controversy, but from a love of truth.

The first account that was published of the French reflecting telescope was in the fifth volume of the Philosophical Transactions of London, in the month of May, in the year 1672, almost immediately after the account of Sir Isaac Newton's construction, which was given in the same volume; and a claim was set up by Caffegrain as to the priority of his contrivance, which, however, was not substantiated; nor was the matter of importance to determine, as the constructions are dissimilar, and as Dr. Gregory's instrument preceded both. The supposed advantages of Caffegrain's telescope over Newton's were stated to be these: viz., 1st. That the aperture was not limited to a confined number of rays incident on the large concave speculum; 2dly. That the reflection of the rays will be natural, since it is made upon the axis itself, and will therefore be more vivid; 3dly. That the vision will be more pleasing, when the face is screened from too much light by the broad end of the tube; and, 4thly. That there will be less difficulty in discovering objects with the eye facing them, than when turned from them. If these are advantages, they are, however, equally belonging to the Gregorian telescope; and we shall presently have occasion to state what was Newton's opinion on each of these points. In this, as in the Gregorian construction, the power can always be increased farther than the aperture will bear;
and, therefore, an increase of focal distance of the large speculum, without a proportional increase of aperture, will answer no good purpose, but will render the tube unmanageable. When the aperture of a Cassegrainian or of a Gregorian telescope is to that of Newton as 7.5 to 6, it has been proved that they have equal light with the same powers; the Newtonian having the advantage, in consequence of the obliquity of the angle of reflection of the small plain speculum.

Sir Isaac Newton's construction of the reflecting telescope differs from both the Scotch and French in this respect, that the large concave speculum is entire, and that the small one is quite plain, and placed at an angle of 45°, a little short of the focus; so that the converging rays come to a focus between the small speculum and the side of the tube near its superior end, as seen in fig. 4. of our last plate. Sir Isaac had discovered, in his experiments on reflected light, that the more rays are reflected in an oblique than in a perpendicular direction; and, that, consequently, there would be more light returned to the eye by a small speculum set at 45°, than would be if the angle of reflection were greater. In this instrument, the theory is much more simple than in either of the preceding instruments, on account of there being but one image, *b,* formed by the incident rays *a* and *c,* after two reflections, one of which takes place at the large metal *B D,* and the other when the rays are in a state of convergence, at the small plain speculum *E F,* so that the whole length of the focal distance of the large metal *B D,* is *B F + F E,* or *D E + E F,* and this distance, divided by the focal distance of the small eye-glass *G H,* reaching to *E,* gives the whole power. This calculation is as simple as in the astronomical refracting telescope above explained, and is analogous thereto. In the instrument first completed by Sir Isaac, the eye-glass was a plano-convex, with the plain face turned to the eye, and 4th of an inch focus, while the focal distance of the small speculum was 64 inches, and its aperture 14; hence its magnifying power was \[ \frac{6.93}{1.66} \] or \[ \frac{64}{4} = 16. \] This was at the time considered a good proportion between the power and aperture, and a table was constructed for different focal distances upon this radical proportion; but it would answer no purpose to copy this table at a time when the reflecting telescope, in every construction, is brought to nearly a state of perfection by the successive improvements of different artists. In this way of producing the image, the position is inverted; and the only mode of increasing the power with the same eye-glasses is by lengthening the tube and focus of the large speculum; or with the same large metal, by shortening the focus of the eye-glasses. In this telescope, any of the eye-pieces, simple or compound, may be applied at pleasure; and if the large speculum be made of the best metal, of a proper parabolic figure, and with a good polish, the image will be sharp and well defined; and as there are no colorless rays in a separated state, the charge, or power of the eye-piece may be great in proportion to the focal length of the large metal, which is the distinguishing character of this construction, particularly when the small speculum is perfectly flat and well polished. The principal objection to this, as a portable instrument, is its unmanageable length, which was first given it by Hadley, who out of a pigmy made it a giant, and astonished the philosophic world. The length of the tube was made six feet, in which was included a metal of six inches aperture, and 62½ focus; and Newton's power of 38 was increased to 232. See Phil. Trans. vol. XXIII. p. 523, or Abr. viii. p. 165.

In Sir Isaac Newton's reply to Cassegrain's claim of superior advantages, he states, first, that there will be more light lost by reflection from a small convex speculum, than from a plain speculum of an oval shape, and placed in an oblique position; secondly, that the convex speculum will not reflect the rays so truly as the plain one, unless it be of an hyperbolic figure, which is difficult to form, and even then will reflect only those rays truly which respect the axis; thirdly, that the errors of the convex surface will be augmented by the distance through which they pass before they reach the eye; fourthly, that the errors of the convex surface will be increased by the deflection or bending of the figure from the points where the incident rays ought to fall; fifthly, that on this account the figure is required to be more perfect than art can make it; sixthly, that the errors of the large metal, which is considered to be spherical, will be so augmented by reflection from the small convex metal, that inordinate flats will ensue, such as will not allow either a great aperture, or a high charge; and lastly, that the astronomers contribute to increase the power, an over-charge of power, compared with the aperture and focal length of the large speculum, will be unavoidable, so as to produce very obscure and confused vision; for if the small metal be made with a larger radius, in order to diminish the power, too many of the incident rays will be intercepted; and if the charge of the eye-glass be diminished, the area of the field of view will be so far diminished, as to render a small object only visible, and that difficult to find. These might be objections a century and a half ago; but most of them have yielded to subsequent improvements in the nice art of cutting, grinding, and polishing of specula, which we explained under the word Speculum, and in the formation and arrangement of the Huygenian eye-piece, which we have said is peculiarly suited to reflecting telescopes; though single leaves will do very well when the spector confines the axis of his eye to coincide with the axis of the lens, so as not to produce distortion in the figure of the image viewed. It may be proper to mention further here, that the small telescope called the finder, attached to telescopes of considerable power, was first proposed by Sir Isaac Newton, to remedy the difficulty of finding the object with his reflecting telescope; and Descartes had described it in his "Dioptrics" as answering the same purpose when applied to his best telescopes. Indeed objections well founded and rationally stated have led to various improvements in the mechanical arts, and are never to be disregarded, unless they are obviously futile. Had Sir Isaac Newton lived to have a peep at the instrument which next claims our attention, he would no doubt have been highly gratified at the progress which the art of constructing telescopes has made since his six-inch reflector, with its ball and socket, was mounted over a candle-thick, or a small pillar greatly resembling this domestic utensil! And yet, to do justice to his inventive genius, if we may apply figurative language to such a subject, the seeds of all the fruit that has since been matured were contained in his primitive little kernel; and we are proud to claim the Newtonian as the English production.

"Though laft not leaft," the Herschelian telescope now offers itself to our consideration, which we might with some propriety call the German telescope, inasmuch as the celebrated contriver of its wonderful mechanism is a native of Hanover: it was however constructed in England, and by English workmen, except so far as the ingenious knight of the Royal Hanoverian Guelphic order lent his powerful
powerful assistance, partly in the execution, but chiefly in the contrivance of the mechanical appendages. The work was immense, but royal means furnished the power that overcame every obstacle. In magnitude, as in power, the forty-foot reflector at Slough exceeds every instrument that human industry has yet put together, and stands as a proof of great mechanical skill directed by an entering mind. We trust that we cannot be underdiligent to derogate from the merit of Dr. (now Sir William) Herschel, when we state that the idea of giving a small degree of obliquity to the large speculum of a reflecting telescope, so as to bring the image formed in the focal point out of the body of the tube, at its aperture, originated with Le Maire (see Machines Approuvées, par l'Academ, vi. p. 61.) about the year 1728; for as we know not that this suggestion ever came to the eye of this illustrious astronomer and mechanic, previously to his undertaking the Herculean labour of constructing a telescope with a speculum of forty feet focal distance, and four feet diameter, it would be unfair not to allow him the credit of the invention as well as of the construction. We mention the name of Maire in compliance with our system of tracing, or attempting to trace, from historical evidences, the origin of each mechanical invention that has contributed, immediately or remotely, to the promotion of the mechanic arts. The theory of this construction is easily explicable, by a reference to fig. 5. of our plate of the Theory of Refelting Telescopes, in which, as before, A B C D is the tube, and B D the large speculum of the immense weight of 2118 lbs.; the incident rays a b and c d, which would have come back to a focus at the point c, in the centre of the aperture, if the axis of the speculum had coincided with the axis of the tube; in consequence of a small inclination of the speculum, given by screws behind, come to a focus near A, at the edge of the tube, where the image of the object is formed by only one reflection, which is the leading feature of the construction. This simplicity of principle is very convenient when a large aperture is wanted, because the head of the observer may be placed entirely at one edge of the tube, so as not to intercept any of the rays at the time of making an observation; but as the eye looks down the tube in every state of elevation, not only must the back be turned to the object viewed, but the observer must be mounted nearly as high as the superior end of the tube, in order to make his observations; hence various pulleys, ladders, scaffolds, &c. became necessary to enable the observer to adjust both the instrument, and at the same time his own position, all which will be better understood from the drawing, when we come to explain the particulars of the construction hereafter. The power of the Herchelian, as that of the Newtonian telescope, is obtained from the ratio between the focus of the speculum and the focus of the eye-glass, which in this instrument is not very short, though the image is formed by simple reflection. The mode of varying the power is the same, therefore, as in the Newtonian reflector, and requires no further explanation.

4. The Conprojection of Telescopes.—As we have now given both the history and theory of telescopes at considerable length, we shall not be under the necessity of dwelling long on each of the several constructions; particularly as a reference to the drawings which we have given, and which are mostly original, will exhibit to the eye more precise information on this part of our article, than any minutest detail would do, unaccompanied by such visible representations. Now that the long aerial telescopes are no longer in use, we shall not fill our pages by describing the different kinds of mechanism that were applied for rendering them useful in observations, by Huygens, Perrault, Sebatian, Mainan, and others; most of which are described in vols. i. v. and vi. of the "Machines Approuvées par l'Académie, &c." to which we beg leave to refer the curious reader who wishes to know the particulars. All the supports for long telescopes had necessarily one property, which is defirable also in ladders that are made for modern telescopes, but which is frequently neglected; and that is, that the object-end of the telescope was steadily supported by some point of rest near the remote extremity, where the rays were incident. Indeed various ladders or mountings, as they are sometimes called, have been contrived for the convenient support of a telescope, when it is too heavy for the pocket, and incapable of sliding by concentric tubes into a portable form; but in every useful ladder the following properties ought to combine: first, the instrument held by it should be kept firmly in its place, if of the refracting sort, so that the image may have no vibratory motion unfavourable to distinct vision, occasioned by an unsteady position of the object-glass; but if it be of the reflecting kind, then it should be so suspended, that tremulous motions arising from compactness of the materials, such as easily transmit vibratory impulses, may be avoided: secondly, a motion in azimuth, and another in altitude, are indispensible; and if the instrument be bulky, or have great power, in each of these respects there should be both a quick and a slow motion, the former to save time, and the latter for the sake of accuracy; thirdly, when the instrument is pointed to the required object, it should not be liable to be easily moved by any accidental touch of the observer's hand or body; unless it is managed in a state of suspension, as is the case with the larger reflectors: fourthly, the parts of the stand should be strong enough to bear the superincumbent weight, and not liable to get out of repair; and fifthly, its position should be in a situation not easily shaken, or moved by the observer's weight, or that of a bystander. When these properties are attended to, the exact shape and external appearance become matters of secondary consideration, and each artiff can pursue his own schemes in the construction; but in this, as in several other departments of the mechanic arts, that work is best and quickest performed, which is done from approved patterns.

Refracting.—We will first describe the refracting telescopes represented in Plate XXIX., and shall then proceed to the reflecting instruments contained in Plates XXX. and XXXI. of Astronomical Instruments, omitting those portable instruments that are in the hands of every reader, such as opera-glases, &c. and that belong more properly to the head of Optics.

One of the best ladders for a thirty-inch refractor, by which we always mean an achromatic refractor, is that exhibited in Plate XXIX. fig. 1.; in which, A B is a tube of brass, mounted on the tripod stand of the same metal C D, and fixed by means of the screws Q and R. In the common construction, the horizontal motion is at C, at the top of the stem or cylinder, and the fylums of tubes F, E, P, is not applied, so that there is neither the slow adjustable motions, nor is the instrument steady in any given position; but here the horizontal motion is at D, at the lower extremity of the cylinder, where there is a long bearing for the pivot, with a tightening screw underneath the junction of the feet, and a clamp S to fix the instrument in any given direction. Also the handle in fig. 5, with a Hookes joint, taking the squared axis of the screw at D, gives the slow motion in azimuth, while the sliding and adjustable tubes F, E, P, keep the angle of elevation unaltered. These tubes turn on a joint at P; and when a due elevation is given by the quick motion, occa-
founded by the freedom of sliding, one within another, a clamping screw at E fixes them, and the flow motion produced by the screw F finishes the observation in altitude, as the handle in fig. 5. does in azimuth; and both flow motions can be managed, one with each hand, at the same time.

In the present representation, the celestial eye-piece H is screwed into its small tube, which bears a concealed rack, that is acted on by a pinion on the axis of the thumb-piece G, which may be made more or less tight by a screw in the middle of its plane, and which adjusts the eye-pieces for distinct vision. There may be any number of various celestial eye-pieces, but two or three are as many as are usually delivered with an instrument of this size. The object-glafs are inserted into the mouth of the tube at B, and is so fixed by trial, that the most distinct view of an object is had when the eye is carried home, in which situation the receiving socket is fixed by the maker; so that uncorrecting the object-glafs at any time does not injure the instrument. The centre of motion in altitude is at a joint above C, and the headings of the tube A, B will depend on the distance of this joint from the system of concentric tubes F, E, P, which may be more conveniently placed towards the eye-end than towards the object-end of the main tube, and with equal effect. When the cylindrical piece beyond the joint of the lowest tube at P, is withdrawn from its hole in a cork, attached to the vertical cylinder, the tube will pack into another, and the cylindrical end-piece will enter the hole of the cork T, under the main tube, and remain out of the way of injury, parallel to this tube. The tube L, in fig. 2, serves at the end L, into the same place that the celestial eye-piece H now occupies, and is called the terrestrial tube, or terrestrial eye-piece, because objects are seen in their direct position through it, which through the celestial eye-piece are seen inverted.

Near the end L, a pair of glafts, called the field-glafts, are screwed, and the end K contains the pair of glafts which is denominated the eye-piece. We have already shown that these two pairs of glafts constitute an achromatic eye-piece, at the same time that they create the inverted image formed by the object-glafts in the small tube between H and A; and when this image is considered as a real object, then the terrestrial tube is a compound microscope of the most construction.

This mode of describing the arrangement of glafts, is prefumed, will be more easily understood by those readers who understand the construction of a compound microscope, than any other explanation that can be given. The tube L, in fig. 3, is an open tube, which is sometimes made, by particular desire, to receive at its end L the eye-piece, now screwed into the tube I at K; and then, as the empty tube L slides in the tube I K, the distance between the pair of field-glafts and pair of eye-glafts may be varied at pleasure; and as the magnifying power of the compound microscope varies directly with this distance, it is evident that the power of the telescope thus constructed will vary in like manner. But we have shown above, that the power of the telescope may be varied also by varying either the pair of field-glafts, or the pair of eye-glafts; hence, when a great variety of powers is desired for the same instrument, different pairs of field and of eye-glafts may be adapted to the same terrestrial tube with very little additional expense; and in fig. 4, we have given three different pieces of short tube, containing male or female screws, or both, which are called adapters, by means of which the celestial eye-pieces may be adapted as eye-pieces to the terrestrial tube, so as to gain a great increase of power for particular purposes. When the adapter M, in fig. 4, which has both a male and female screw, is screwed into the end K, of the terrestrial tube in fig. 2, the celestial piece H, fig. 1, may be substituted for the pair of eye-glafts belonging to this long tube, whenever occasion may require; or the pair of terrestrial eye-glafts may be made into a celestial pair, on occasions when a low power and enlarged field are wanted. The adapter O, in fig. 4, has two dissimilar female screws, the smaller one of which screws upon the long tube at the end I, while the larger end receives the outer end of the celestial eye-piece H, in fig. 1, and converts it into a pair of field-glafts, for which it may be substituted, to get the greatest possible power, with a high magnifier also at the end K, or rather at L, with the sliding eye-tube; and in this way the power may be increased to such a pitch that all light will disappear, and the instrument, consequently, will then become useless: but it is better to have additional pairs of proper field-glafts, than to substitute eye-glafts for this purpose, because the arrangement of the focal distances of the field-glafts is different from that of the eye-glafts, when they are arranged in the bell manner, as we have explained under our last section. The adapter N has two male screws and a female screw, one of which male screws will fit the tube at H, fig. 1, and the other the tube at K, fig. 2, or L, fig. 3, and the female screw will receive Troughton's micrometer in either place, or any eye-piece having a mother-of-pearl micrometer, even though it may belong to another telescope. Thus the adapters, which are simple in their construction, of little expense, and very portable, afford a variety in the use of a telescope, that is at the same time both useful and entertaining; and we have been the more minute in our description of them, because they have never before been brought into public notice. The powers of this telescope usually vary from 25 to 100 without the adapters, as they are made by opticians; and opticians are no advocates for adapters that increase the powers too much; but for certain purposes the power may be augmented to about 150 with difficulty and tolerable light; but then it must be recollected, that the field of view will admit of only a small object, as well as little light, when the power is augmented out of due proportion.

Fig. 6. is a representation of a five-foot achromatic refractor, mounted in the most useful and convenient manner for making either celestial or terrestrial observations, and has all the appendages which we have just described as belonging to the thirty-inch refactor, when made in the bell manner. A, B, as before, denote the main tube, which has a diameter of 4 ½ inches; and instead of one set of sliding concentric tubes, here are two, inserted into the corks P and P, of a three-legged fland of mahogany, of which two legs only are seen in the figure, and these shortened, so as to fall within the room allotted them in the plate. The construction of this fland has been described under the article Equatorial Stand, with a reference to fig. 5. Plate X111. of our present series of plates; therefore we shall satisfy ourselves with such a short description of the constituent parts here, as will simply enable the reader to understand their uses. The milled nuts Q and R, attach the main tube A B to the wooden fland; and the tubes A P and A P keep it steady from vibratory motion: the semi-circle of brafs between Q and R, moveable about its centre, is racked at the concave part of its circumference, so as to fit the screw on the axis of the handle U, which we have made short, to avoid confusion in the figure; therefore, when the screw is pressed close into the notches of the rack-work, a revolution of the handle U, in either direction, will produce a corresponding motion, in elevation or depression, in the telescope borne by this semi-circle, while the vernier and divisions on the face of the semi-circle indicate the quantity of elevation, when zero is properly adjusted. The manner in which this mechanism acts, and also the method of
TELESCOPE.

producing horizontal motion, will be best understood from an examination of fig. 7, in which the parts are enlarged, and in which the same letters denote the same things. The thumb-screw V, concealed in fig. 5, when turned round, profiles on the fixed metal under it, and draws up the frame Y, of which one side is seen, that holds the axis of the screw W, and that turns on two pivots at its remote end X; and in this manner the screw is brought into contact with the notches of the racked semi-circle, or is detached from it by a contrary motion. In the former case there is a flow motion in altitude, and in the latter a quick one. Again, the axis S, of another horizontal and parallel screw, receives the handle, like fig. 5, for giving the motion in azimuth. This screw is also profiled into contact with a horizontal racked wheel, that lies fixed between S and W, and gives the flow motion. The screw of pressure is seen above S, and when the axis of the handle has its screw detached from the racked circle, the telescope is at liberty to have a quick motion in azimuth. The chambered plate, on which the racked circle rests, is graduated, and the vernier at W reads the hours and minutes of time; but in order that this circle may be parallel to the equator in the heavens, so as to indicate time truly, it is necessary to turn the upper half, C, of the block half round, and to turn the whole hand so that the plane of the graduated circle may be parallel to the plane of the equator, which it will be when the upper point of the axis of motion is directed exactly to the north pole, in which situation the hour-circles will coincide with the horary circles of the heavens, or must be made fo by an adjustment, which the graduated circle is capable of receiving, by means of an elongated hole, into which the screw enters that fixes it to the block. This block, we have said before, is called Smeaton's block, and answers the purpose of giving an equatorial motion to the telescope, when following a heavenly body by night, and is useful for finding one by day, from a knowledge of its right ascension and declination; for what was altitude in the horizontal position, becomes declination in the equatorial elevation. This telescope is one of the four of which we propose to exemplify the uses in conjunction with Troughton's micrometer; and therefore we have had the micrometer put into its place at K, when the terrestrial tube I is used; but it might have been at H in place of the celestial eye-piece, where the value of the revolutions of the micrometer screw would have been as we have tabulated it in our last section. The two terrestrial eye-pieces in fig. 8, and one not given there, are made to screw into the terrestrial tube at K, in addition to all the four celestial eye-pieces, which have an adapter to fit them to the fame place successively; which variety affords the choice of seven terrestrial powers with one pair of field-glasses; and as there are three pairs of field-glasses, the variety becomes $3 \times 7 = 21$ different powers with a fixed eye-tube; but as the eye-tube also thickens, the powers may be varied in small quantities at pleasure between the two extremes. In this instrument, the end I of the terrestrial tube does not screw into the celestial tube that bears the rack, but into an intermediate flanged-tube, which is here marked H, the use of which is to allow an adjustment for vision at very short distances, which adjustment requires a great length of tube to be drawn out. For the construction of Troughton's and other micrometers, we must refer to our article Micrometer.

The screw G of adjustment for distinct vision, is concealed in our drawing by the finder or small telescope attached, over A, to the main tube, the use of which is to bring the object readily into the field of view of the large telescope; which is not an easy matter, when the power is great; for as the field of view increases with a diminution of the power of the telescope, and vice versa, the small telescope saves much time in searching for any object that is visible in it. But the micrometer would be of little use in the night for measuring small angles, except when the moon is the object, unless some mode of illuminating the wires, or spider's lines, used in making the measurement could be adopted. Formerly this object was effected by a piece of brass, faced with card paper, attached to the object-end of the telescope, as in fig. 15, and turning on a pivot, A, to any angle of inclination or reclination that the position of a lamp, or candle, might require, of which the light was to be reflected into the tube; and an oval hole, in the middle of the reflecting plate, admitted the incident rays coming from the object to be viewed; this plan, however, is attended by the inconvenience, that either the lamp must be supported by the object-end of the telescope, so as to rise and fall with it, or otherwise the angle of inclination or reclination of the reflecting piece must be altered in every new position. The first person who, we believe, laid aside this apparatus, and introduced a diagonal reflector into the body of the tube, was the Rev. Dr. Uther of Dublin, who brought the light within the axis of motion of his transit telescope, as is now commonly done; which method has the advantage of giving light in the same manner at all elevations, while the place, where the lamp is placed, never varies. (See the Transactions of the Royal Irish Academy, 1788, vol. ii. p. 13.) This method, however, was not considered as applicable to an ordinary telescope, where the axis of motion is below the tube; but Mr. Troughton has very lately applied this principle with success in the telescope before us, and in others of the same construction. At Z, over the centre of motion, a hole is made in the tube, of about one half the diameter of the tube, into which a covering cap of brass, when excessive light is not wanted; then an elliptical plate of brass, rough gilt, with an elliptical hole in the middle, is reclinued in an angle of 45°, within the main tube, in such a way as to receive the lateral light of a lamp or candle, which it reflects along the tube to the eye-piece of the micrometer; and the light thus reflected is not only mild and pleasant to the eye, but may be modified, as to quantity, by the position of the lamp, and will remain in the fame all altitudes, if the lamp be in the same horizontal line with the reflector, and stand at a proper angle with the plane of the reflector. In using the telescope before us, we found that some of the rays falling on the extreme parts of the object-glasses were lost in the tube, and that consequently either the diagram was too small, or that the oval aperture of the inclined reflector was not sufficiently large; but the difficulty of the image is no doubt promoted by such exclusion; and, indeed, it is the practice of some opticians, when they find the longitudinal aberration arising from the spherical figure of the convex glasses not well compensated by the convex one, to cut out the extreme rays on purpose by the use of a small diaphragm, for which alteration we have Mr. Dollond's authority. In the first place before us, we have ascertained by a diametetor, that the reduction of the aperture is in the ratio 50 : 25.6, namely, from 4.5 to 3.84 inches; but our intention is to have the original aperture retained.

When a refracting telescope exceeds five or six feet in length, it requires to be supported at both ends, and then the nearer support must have adjustments for both altitude and azimuth, while the remote one may be a point of rest. Fig. 8, Plate XXX, shews a support for the object-end of a long telescope, which we believe was contrived by Smeaton, and which answers its purpose sufficiently; A B C D is a mahogany
mahogany light frame, four feet six inches high; the cross-piece, A B, is fifteen inches long, and the piece C D, seventeen, the distance of eighteen from the other; another frame, E F G H, with parallel sides, nine inches apart, and more slender than the other frame, passes through the crossbars of the former, in such way, as to have an easy motion; a cylinder or rod of brass is screwed by its head-piece to the cross-bar E F, and descends from M to N, through a wooden screw L O, which is hollow within, and cut into a screw round its circumference; this wooden screw terminates above with a brass socket and thumb-screw, which acts as a screw of pressure against the interior brass rod; the thick wooden piece L has a female screw, acting with the male screw of the hollow wooden cylinder L O, but is so made fast to the cross-bar A B, by a circular plate of brass above, that though it will turn round, it will neither ascend nor descend; consequently will produce an ascending or descending motion in the wooden cylindrical piece L O, and also in the brass rod M N, held by the screw K, attached to it. The concave piece of brass I has two motions in its item, one horizontal, and the other vertical, like those in the stem of a small telescope, and receives the eye-end of a long telescope to which it is screwed, while the remote end is supported by the branch of a tree, the block of a pulley, an opening in the roof of a house, or other elevated part of a building. The adjustments are thus managed; when the elevated end of the telescope is made to rest on it, the eye-end adapts itself to the inclination by the joint in its item under 1; then the whole frame is turned to face the object, when the circular motion of the same small item yields, and allows the long tube to remain quiet; and if the tube is not exactly pointed in azimuth to the object, the brass piece P, into which the item I is made fast, slides along a groove made in the front face of the cross-bar E F, until the adjustment for azimuth is complete. This sliding motion, being small, may be either quick or slow, as the observer desires; therefore, when a body in motion is once in the field of view, it may be followed without difficulty, by pushing the sliding-piece P in a proper direction. The quick and slow motions for adjustment in altitude are separate, and are thus produced; first the thumb-screw K is turned back, so as to let the rod L N be free for nearly its length, when it is fixed, and then the piece L is turned backward or forward, as the case may require, with the right hand, while the left hand slides the piece P, until the object is in the middle of the field; and when distant vision has been properly obtained by the small tube at the eye-piece of the telescope, the pieces L and P, held respectively in each hand, will always afford the means of keeping the object in the proper part of the field; and though the support has but two legs, yet its connection with the support at the object-end, through the heavy tube of the telescope, will always keep it in its place when the adjustments are left. It will not be necessary to describe any more flaws, of which a great variety might be produced, that have been devised for retracting telescopes, because we presume that our readers will be able, after what we have said on this subject, to select such as may best suit their respective purposes.

We come now to describe the portable patent achromatic telescope, without a brand, that was invented by Dr. Brewster, and is sold under the patent by Mr. Harris, optician, in Holborn, London. The construction of this telescope, of which we have already explained the theory, is two-fold, and may be explained by figs. 4 and 5. Plate XXX. In fig. 4, the tubes are supposed to be transparent, or otherwise divided, that the interior parts may be seen in their respective situations; A B C D is the outermost tube, of mahogany, with brass ends, containing at a bronze objective-glass, A B, at its exterior end; E F G H is the next tube of brass, sliding smoothly into the mahogany one, without lateral shake, and may be called the second tube; into this tube the third tube, I K, is screwed; and in its turn receives the fourth, or terrestrial eye-tube L O, containing the pair of field-glasses L M, and pair of eye-glasses N O; all which tubes slide into the space of twelve inches, (including the cap,) to fit the pocket. The principal objective-glass, A B, is an inch and seven-eighths in diameter, and has a focus of 184 inches; and if there were no other glasses but the four contained in the terrestrial, or fourth tube, this would be nothing more than an ordinary portable or pocket achromatic telescope; but at I, in the second tube, is screwed a second objective-glass of the achromatic sort, the diameter of which is one inch and three-eighths, and its focus 14 inches. When the second tube, E F G H, is pulled into the wooden tube A B C D, the second objective-glass, I K, approaches the principal objective-glass A B; and when the third tube, I K, is also pulled in, the two objective-glasses come nearly in contact at the end A B of the telescope; in this situation, the compound focus of the two objective-glasses, by the theorem \( \frac{F \times f}{F + f} \) is about eight inches, which is the shortest possible; and in this state of the tubes, when the eye-glasses are adjusted for distant vision, the power is the smallest possible; but when all the tubes are drawn out, the balance between the objective-glasses, and consequently the power, will be the greatest possible, because the converging rays coming from the principal objective-glasses A B, will have passed through one-half of the tubes before they fall on the second objective-glasses, and undergo a second refraction, so as to come to a shortened focus. In every intermediate position of the objective-glass I, the power of the telescope, that is, the compound focus of the two objective-glasses, will be determined according to their intermediate distance, by the theorem \( \frac{F \times f}{F + f - d} \). Thus in every new position of the second objective-glass I, the telescope will have a new power, and these powers might be marked by a scale running lengthwise along the second and third tubes which separate the two objective-glasses; but the inventor has made another use of this property, by converting it into an optical micrometer: he has fixed two parallel wires in the focus of the eye-piece, and also two points of metal, to include a larger angle, in a direction at right angles to the former; so that when one pair includes a horizontal angle, the other will include a vertical one; an experiment is then made by actual measurement, of a divided scale, placed at a measured distance, to ascertain what is the angle measured by the points in the eye-piece, when the object is seen between the parallel wires in each of the extreme positions of the second objective-glass I, and strokes are marked accordingly, as the boundaries of the intended scale, the end of the next contiguous tube being the index; thus in the instrument before us, the extreme points or strokes of the scale a b, in fig. 5, measure 110° and 218° respectively, at an interval of 15 inches; and as it has been determined, both from theory and practice, (see Dr. Brewster's Treatise on New Philosophical Instruments,) that the scale of measures is a scale of equal parts, these 15 inches are divided into 100 (218 - 110) minute spaces, while each minute space is bisected into spaces of 30°, which might again be bisected by the eye, if the adjustment for vision could be made so nicely as to admit of such estimation. Hence it is easy to conceive how this telescope will measure any angle subtended by a distant object of unknown dimensions,
TELESCOPE.

fions, between 110′ and 218′, within the accuracy of 30′: it is also easy to conceive, that, the angle increasing as we approach an object, the same object may be made to fill the field between the measuring points in a new flattion, provided the distance between the two object-glasses be fo altered, by trial and adjustments, that the exact power is found such as will command this condition, and the new angle at the second flattion will be indicated, as the one was at the first; and when the distance between the flattions is measured in a right line leading directly to or from the object, the difference of the angles will afford data for determining the distance of the object from either flattion. For example, supposing the tangents of small angles to be equal to the angles themselves, we call the greater angle $m$, the smaller angle $n$, and the distance between the flattions $a$; then, as the distances of the object from each flattion will always be inversely as the measured angles, we have $n : m$ (of the angles) for the ratio of the distances, and the real difference of the same distances by measurement of the interval; therefore, by one of the simplest theorems in algebra, we have $\frac{am}{m-n} = \text{the greater distance}$, and $\frac{am}{m-n} = \text{the smaller distance}$: thus, if we suppose the first, or smaller angle $= 40′$, and the second, or nearer $= 68′$, with the interval 120 feet, we shall have $\frac{120 \times 68′}{68′ - 40′} = \frac{8106}{22} = 370.9$ for the greater distance, $\frac{120 \times 46′}{68′ - 40′} = \frac{5520}{22} = 250.9$ for the smaller, and the difference, as before, 120.

But it will be seen in a subsequent section of our article, that to determine distances from small angles with great accuracy, the value of a single second ought not to be neglected; and that a correction for want of parallelism, at short distances, is necessary for obtaining the true angle, whenever that is wanted. The author, however, has shown, that the correction in question will vary nearly with the varying length of the telecope, and will not affect the ratio of the angles measured, on which the respective distances depend; but this coincidence of the correction with the length or power of the telecope, does not obviate our objections where real measures of angles are required, and where extreme accuracy is necessary for the success of the operation. But we have said the construction is twofold: it is extremely difficult, if at all possible, to hold the telecope steadily without a stand, that the angle, contained between the two fixed points in the focus of the piece, can be measured with precision; and this difficulty probably led to the subtilization of the divided object-glasses, seen in fig. 6, and edgewise in fig. 7, for the second object-glasses 1, which we have described. If this divided object-glasses, screwed into the second tube at I, had precisely the focal distance as the entire one, and had the centres of the faint-lenses brought exactly into contact, the same rule and the same mode of taking the measure of an angle, would apply with it as with the one we before denominated 1; likewise the points in the eye-piece would be necessary. But to do away the use of such points, and to render the instrument equally useful without as with a stand, the second object-glasses that we have now to describe, as constituting the second construction of the telecope, was divided in the centre diametrically, and had its centres removed from each other, so that each filament forms a separate image of the object viewed. In this construction, two points may be fixed on any object, and when the tubes are so drawn out, that point $a$ in one image coincides with point $b$ in the other, as in Dollond's object-glass micrometer, then the angle subtended by a line connecting the points $a$ and $b$ will be indicated on the second scale, or scale $c$, in fig. 5. This scale in our instrument begins with 11′, and ends with 75′, so that the length of 15′ inches, being divided into 64 (75 – 11) spaces, admits of these minute spaces being subdivided into three of 20′ each; and if the adjustment for distinct vision would allow these to be bisected by estimation, the smallest quantity to be measured would be 10′ on this scale, which is indeed as small a quantity as the power of the telecope is capable of distinguishing; and therefore a longer scale would have been of no greater value. The peculiar advantage of this construction, is, that, as in Hadley's extant, a motion in the instrument does not injure the accuracy of the observation, or impede the operation of taking it; but affords the opportunity of re-examining the extremities of the apparent contact. Hence the use of this instrument affords a pleasing exercise, and the necessity of an stand is entirely obviated. We have the authority of Tuley, the only maker, to say, that his grace the duke of Wellington had one of their telescopes, with silver tubes, presented to him by a friend, and there is reason to infer, that his using it as a coning-up glass gave him the advantage of ascertaining, better than any of his flint, in what direction the enemy was moving on certain critical occasions. For when it is ascertained by observation, whether the angle subtended by a man in motion is increasing or diminishing, it is easy to infer whether the man is approaching or receding, though the exact measure of the angle be disregarded. And as it is equally easy to ascertain whether a ship is gaining or losing ground in a chase, when two points in a mail can be distinguished. When this patent telecope has the divided object-glasses as the sliding one, the two images appear exactly similar to those in Dollond's divided object-glass micrometer, but the range of scale is much greater; if Dollond's has any advantage over this, it is, that the power of his telecope is usually greater, and that the measures taken at different flattions do not depend on two adjustments of the tubes longitudinally, though it is necessary always to have distinct vision, when the edges of the images are brought into contact. We consider that neither of the constructions of the patent telecope, on its present scale, is competent to the measurement of distances from one flattion with sufficient accuracy; neither has it a range of scale sufficient to make it generally useful for all angles. The writer of this article has had the divided object-glasses made to have their centres adjustable to different distances from each other, so as to be capable of measuring all small angles from 1′ up to 75′, and to be estimable by the same scale in the different positions, the value of the first and last positions of the tubes being determined experimentally for each position of the filament, and the marks for the positions being so made, that when the scale runs up in the first position of the filament, the same scale shall begin the scale at their next position; and thus a succession of minutes is continued from unity to the extreme end of the scale at the last position of the glasse; consequently one such instrument is capable of doing as much as several instruments with different pairs of filament-glasses can do, when put in a fixed position according to the patent. But after all, the initial and final values of a scale of a given length much depend on the difference of the focal lengths of the principal and sliding object-glasses; and, therefore, to observe the nice variations in the diameter of the sun or moon, it would be desirable, that the whole scale should measure only about 5′, viz. from 28′ to 33′; and then, if the telecope had power enough, the subdivisions of the scale might ascend by single seconds. Indeed it is yet a de-
TELESCOPE.

desideratum in astronomical instruments to obtain an unobjectionable, and at the same time an easy method of measuring, by a micrometrical telecope, the distance between two very small stars, so near to each other as to be called double stars; for when so much extraneous light is admitted into the telecope as to hide the spider’s lines, or scales of a mechanical micro-

meter, the minute stars vanish; and, when optical micro-


cmeters with double images are used, the light is so divided between the images, that the star also vanishes, in this case, from want of light. Dr. Malkeleye’s prismatic micrometer is, perhaps, less liable to this objection than any other, but is not yet brought into common use.

Before we dismiss this part of our article, we beg leave to state, that about a hundred years ago, De la Hire con-


trived a method of giving different values to a pair of wires fixed in the focus of the principal object-glas of a telecope, by means of another moveable object-glas: and also that about the year 1771, Mr. James Watt, celebrated for his improvements on the steam-engine, not only contrived the same thing, but actually made the measurement by a longitudinal scale marked on his tube, nearly as done by Dr. Brewster. Mr. Watt’s claim to originality, we believe, is undoubted, and may be proved both by his letter on the subject to Mr. Menzies, written near that time, which letter is still in exist-


ece; and also from the circumstance of his having about the same time desribed his new instrument to the late Mr. Ramden. With these prior inventions, however, we are well assured Dr. Brewster was not acquainted at the time of his taking out a patent, in conjunction with Mr. Harris, the present vender of the patent telescope; and therefore he also is entitled to the merit of originality; and moreover appears to have the sole right to the idea of converting it into a general micrometer, of applying it to the divided object-glas, and of converting a Gregorian or Caffegrainian telecope into a micrometer, without any additional lens or mirror. Mr. Watt never made much use of this micrometrical telecope, the impression on his mind being, that the scale ought not rigidly to be a scale of equal parts, which Dr. Brewster has since demonstrated to be the case, and his line of business not leading him to finish all the adjustments for real use.

This ingenious gentleman had previously, viz. in the year 1770, constructed a micrometer, with a pair of parallel horizontal wires, crossed by a single wire at right angles, in the prin-


cipal focus of an ordinary telecope, which acted as a micro-


meter for determining distances at one and a half miles, that a twelve-


feet rod had a circular dие of wood, eight inches in diameter, painted white, that was crossed by a red horizontal line of an inch in width, which dие was made to slide along the rod, while another similar dие was fixed fast about a foot above the ground, when the rod stood in a vertical position; then, at any unknown distance, the sliding dие was lowered till one wire of the telecope covered its red line, while the other wire covered the red line of the fixed dие; and then a scale upon the rod, graduated by experimental measures, indicated the distance by inspection to within 1½ part of the whole. This instrument was used with a telescope of only twelve inches focal length, and an eye-glas of an inch and a half focus, so that the magnify-


ing power was only eight times with this instrument. The survey of the intened canals of Crinan, Gilp, and Tarbert, was made by Mr. Watt in 1773, as well as the survey of the canal running from Invernefs to Fort William, called the Caledonian canal, in 1773. This contrivance was shewn to several friends, and amongst them to Mr. Smieaton, though an account of it has never before been published. In the year 1778, a Mr. Green applied to the Society of Arts in the Adelphi for a premium for a similar invention; on which occasion, Mr. Smieaton advised Mr. Watt to attend at the Society’s rooms, to state the priority of his claim, which was accordingly done; but as Green’s telecope had more magnifying power than Mr. Watt’s, viz. 40, and was suppos’d on that account to be more accurate in determining distances, the claim of priority was ceded in Green’s favour, and Mr. Watt’s invention was suffered to go un-


noticed by the Society.

A double-image micrometer was also invented by Mr. Watt in the year 1771, which, as it has never been described, we shall make no apology for introducing here, in company with his other ingenious inventions. This instrument consisted of a circular disk of glass, whose plane sides were not strictly parallel, but formed with each other an angle of one or two degrees, say a wedge or prism of one or two degrees. This dие or prism was cut by a diamond, at right angles to the slope of the prism, into two unequal segments thus: the left piece, A, was fixed, while the larger piece, B, was movable upon the diamond cut-line, as upon an axis or hinge, as seen in this plan, in which the dotted lines show one of the positions into which B may be moved. When the two segments remain in the same plane, they refract all the rays, which pass through them equally; but A remaining fixed, and B moving upon a centre, as drawn in dotted lines, the rays which pass through B, will be more refracted than those which pass through A, and this will vary with the angle which B makes with A. This divided prism being fixed in the focus of (or before) the object-glas of a telecope, two images are formed of every object by which its diameter may be measured. An index and divided factor of a circle serve to measure the comparative refractions. This instrument, how-


ever, has the fault, that the divisions are not equal parts for equal angles, and moreover the prisms would require to be achromatic, where high magnifying powers are required.

It was not till the year 1777, that the abbe Boscovitch published an account of the prismatic micrometer of the abbe Rochoë made of rock-crystal, with double refraction, and also of his own improvement, or sublimation of glas prisms, where one of them resolved round on an axis of motion like Mr. Watt’s; nor was it till the same year that Dr. Malkeleye published his account of a prismatic micrometer, that measures a small angle by the refracting angle and the dis-


tance of the prisms from the focus of the object-glas con-


jointly; where the length of the telecope was the scale of measurement. See Phil. Trans. 1777.

Reflecting.—We proceed in the next place to describe the confection of reflecting telescopes. Fig. 1, Plate XXX, shews the figure of a reflecting telecope of either the Gregorian or Caffegrainian kind, for their external appearance and mode of using are the same, though we have shewn that their small specula are differently formed. After the minute description that we have given of the flans for achromatic reflecting telescopes, we may avoid prolixity, by giving a short minute account of those that have been appro-


priated to reflectors, where the uses of the same parts are the same: A B is the main tube of a reflecting telecope of moderate size, which may be either with or without a finder, as the power may require, mounted on the tripod G F; at A is the open aperture, and a little short of it, within, is the small speculum, drawn in or out by the screw C, which is connected with a longitudinal bar of metal, into which the heel-piece of the stem of the small speculum slides, so as to be taken away or put in at pleasure; within the interior end B of the large tube is the perforated large speculum, always concave, and of a proper figure to suit the face of the
the small speculum. This large speculum is put in with some liberty, as is also the small one in a box containing a spiral spring acting against it to prevent tremors; B is the eye-piece of the Huygenian kind, of which there are usually two or three, according to the size of the instrument. The semi-circle D is racked, and the handle H turns the screw that gives elevation, while the handle I gives the horizontal motion, by its screw driving the racked horizontal plate E; both which are clearly seen in the figure. The vertical motion takes place at the centre of gravity of the tube at the top of the frame between E and D, and the horizontal motion is from an axis in the centre of the racked plate E, which axis has a long bearing down a tube to G, under the junction of the three legs. The three-barred brace piece F has a joint at each leg, and also at the circular plate in the centre, so that a little force applied under this plate will raise it, and allow the legs to come together into contact, as well as the three arms that keep the legs open when the fland is used. This mounting is very portable and steady, particularly when the tube is short, and is every way convenient for use, except that both the vertical and horizontal motions are slow motions, the former of which is tedious when a great change of altitude is wanted in a given time, but the latter is in some measure remedied by the portability of the fland, which may be easily turned altogether, to face any particular object.

When the length of the tube is three feet and upwards, and proportionally wide, fig. 2, represents a fland that is greatly to be preferred to that represented by fig. 1. We shall put the same letters of reference to the same parts, though there is a difference in the constructions that may require explanation. This fland was contrived and first made by Talley, who, we understand, claims also the invention of the three-barred brace F, in fig. 1, above described. The contriver has evidently contemplated all the requisites for a good construction, and has succeeded in the execution of his plan: A B, as before, is the main tube, B one of the eye-pieces, C the adjusting screw for distal vision, hid in our drawing behind the tube; but in place of it is seen the finder, attached above the eye-end of the main tube. At D is a sliding-piece of metal with a cylindrical hole, through which the round rod H D passes, and to which it may be fixed, by the friction fere D, in any given elevation; to this sliding-piece D, two rods D K, D K, are attached by two joints, and two other joints attach them below to the frame E K, so that these rods K, K, are at liberty to rise and fall as the tube is elevated or depressed, but not until the sliding-piece at D has moved along the rod H D. When the piece D is fixed to the rod by the screw of pressure, it forms a point of bearing for the tube at a distance from the centre of motion, which is at the centre of the tube’s gravity above the frame of brafs work, seen in the figure; thus the telescope is kept steady by two points of bearing in every degree of elevation, though these points will recede from each other gradually as the telescope is depressed towards an horizontal position. When the fere D at D is turned back, the motion is sufficiently quick; but when it is fall, the slow motion is produced by the handle at H; for while this handle turns the rod, the fere cut on its interior end works in a fixed cock, near H, that has a female fere within it, and draws the sliding-piece and rod together towards the eye, and thus elevates the tube, while the joints of the rods K, allow a corresponding elevation in them; so that, without undoing the fere at D, a slow motion up or down is produced by merely turning the handle H, which motion, being free from jerks, is very pleasant. Between the brafs frame bearing the telescope and the large wooden frame E F, are three circular plates, the uppermost of which is attached to the brafs frame, or may be fixed to form the base of it, and has an axis of steel fast in its centre; the second circular plate is racked at the concave edge all round, and has a circular hole in the centre, just large enough to receive the steel axis we have mentioned; the third circular plate forms the top of the wooden tripod, and has also a hole in its centre, just sufficient to admit the steel axis above described, but its diameter is somewhat less than the diameter of the racked plate next above it, so that a rim, made fast to the racked plate, surrounds it, in the manner of a box-lid; but there is no other fastening of these three plates together, than the pressure occasioned by the superincumbent weight of the telescope, and of its subjacent frame E K K: the axis, or fere, of the handle I is made fast to the uppermost plate of the said frame, and takes hold of the notches in the racked plate below it, so that when the telescope is turned round in azimuth, by a quick motion, it takes the frame under it, and also the racked circle, round along with it, while the fland or wooden four-footed frame E F stands quiescent; but when the quick motion is finished, the handle I is still in its place at the eye-end of the tube, and turning it round, will give the requisite slow motion; for turning the handle, in connection with the racked plate, turns the superincumbent frame and telescope, without any motion being given to the racked plate itself, which is now kept down to its place by simple pressure of its load above. The fland, or large wooden frame, is braced in all directions, as may be seen in the drawing, and might be advantageously made of cast-iron, as it is not contrived for the convenience of portability.

The best fland for the Newtonian telescope is that which is represented by fig. 3, in which A is the elevated mouth of a seven-feet tube, and B the place of the large speculum, that reflects the rays of light back to the small diagonal plane metal near C, which, by a second reflection, brings them to a focus at the eye-piece below C, as seen in the drawing. Above C is the finder, the upper end of which has a small achromatic object-glas, and the lower end the eye-glaf. The upper end of the tube rests on a support D, that is capable of being raised or lowered slowly by a pinion on the axis of the handle under D, while the lower end rests on the horizontal bar of the frame E F, that is suspended by a pulley over F; the four pivots a, b, c, and d, of the fixed frame, sliding in the open grooves, seen near the horœ, in the main frame, keep the small frame in any given situation, and allow a free motion, first down the vertical, and then down the inclined pieces, that compose the main frame, as low as to G and H; and when the lower end of the tube has been depressed into this situation, the tube may have an elevation approaching towards the zenith: for not only is the upper end elevated by the handles at J for the quick, and at D for the slow motions; but the lower one is depressed by the handle at I, round which the cord is coiled, that goes round a fixed roller at K, and two others at L and M, before it embraces the pulley N, and is hooked to a pin at O, above the frame. The rest of the main frame is so clearly exhibited in the drawing, that no farther description of it is necessary. In some of the instruments of this construction, when the handle J is omitted, and a quicker motion in altitude is required, and also a greater elevation than can be given finely by the handle at D, the second square item that carries the pinion of the handle is raised by hand, and kept to its elevation by means of a second rack, which is set at liberty by pressing a button at P, connected with the spring-catch of the rack, when this squared item is lowered again, all which motions will be readily comprehended by
any person tolerably acquainted with the mechanism of rack-work. The quick motion in azimuth is given by sliding the lower end of the tube gently along the bar on which it rests, or by moving the whole frame, which moves on ciphers; but the slow motion is produced by the screw at D. It is fearcely necessary to add, that the eye of the observer is applied to the side of the tube near its mouth, when the hinder has pointed the tube properly to its object. This field was contrived by Sir William Herschel, whose experience in the use of various flanks directed him to prefer one that is not liable to propagate vibratory motion to the large speculum, and that has a point of support near the upper extremity of the tube. We have, however, seen a six-feet reflector very readily supported on a frame similar to that exhibited in fig. 2; and the composer of the present article has a Caillegrainian telescope, with a three-feet tube, fixed between the cheeks of one of the doors of his observatory, which turns round with the moveable dome in azimuth, and which elevates in altitude on two pivots reeding in the notches of a pair of brass plates let into the said cheeks; which mode of mounting is not only convenient for celestial observations, but is remarkably free from tremors, which advantage may be owing partly to the design of the speculum, and partly to the mouth of the tube being nearly two feet advanced into the open air. If the dome had not a remarkably easy motion on three loose ebony balls, placed at equal distances, this mode of mounting a large telescope would not afford a slow adjustment for motion in azimuth, which it now does with facility.

It is always interesting to a man of science to know by what progressive steps a great undertaking is accomplished, as well as to learn under what impressions the original idea was entertained of forming the plan of operations. When Sir William Herschel, who was brought up a musician, resided as organist at Bath, the natural bent of his mind led him to cultivate the pleasing science of optics, and to study the theory of mechanics so far as to enable him to manage himself with attempts to construct a reflecting telescope: his success, in an undertaking of considerable difficulty, increased with his endeavours to attain some degree of excellence; and though at first he was satisfied to pick a tolerable speculum out of some dozens at which he had laboured; yet, feeling that his experience began to give him facilities both in the contrivance and execution of his manipulations, he proceeded by degrees to construct specula of seven, ten, and even twenty feet focus of the Newtonian form, to the number of more than 400, besides several of the Gregorian kind: but as yet he was unacquainted with any certain practical method of giving a parabolic curve to the face of his metal; on which account he selected, by trial, such specula for use as he found most perfect in figure, and repolished the remainder. In all these operations there was much room for experimental observation, and the time was not expended in vain. To a mind like Herschel’s, even a failure roused a feeling for a new enterprise; and it was no small step towards advancement, to have perceived the cause of unsuccessful measures: the object being attainable, the means were to be found by skilful perseverence. Nor were the labours of our optician to be confined to the formation of a speculum; his mechanical skill was directed to the contrivance and execution of various flanks for telescopes of an unusual length; and in the year 1778, he produced that which is now usually applied to the Newtonian telescope, and which we have just described as represented by Plate XXX. fig. 3. By the year 1781, Herschel (well known by this title at that period) felt such confidence in his improved methods of proceeding, that he erected a large for a thirty-feet reflecting metal of 36 inches aperture, and succeeded in casting it; but to his mortification, the metal cracked in the cooling. The disappointment attending this accident must have been severe, but did not damp the ardour of the mechanical adventurer, in which light, no doubt, the enterprising contriver was now viewed. A second melting of the same metal was immediately determined upon, and a furnace was constructed for the purpose, which unfortunately gave way, and the liquid metal blew up the pavement.

The mortification consequent on this second accident only plunged our adventurer the deeper, that he might rise the higher in his next attempt. During an interval of some reprieve from optical and mechanical labours, an astronomer, however, was not alacr; and while observations were making on the rotations of the planets, with telescopes of the Newtonian form, of 7, 10, and 26 feet focal length, the little planet, at first supposed to be a comet, from its having a visible magnified disc, was discovered. This lucky event reminded the optician’s arbour, and at the same time introduced him to the notice of his majesty; who, by his liberal patronage, promoted the views of this amateur instrument-maker, and afforded facility to his future operations.

In the year 1782, a good twenty-feet reflector was finished with a large aperture, and mounted on the Herschelian field for admitting of front observations, for which it is found very useful. The forty-feet telescope, or master-piece of mechanism, which is more immediately the object of our examination, was begun at Clay-Hall at the latter end of the year 1785, when, through the mediation of the president of the Royal Society, the support of regal munificence had been graciously promised; and, when the various portions of the bulky structure, which employed forty workmen of different denominations, had been removed to Slough, near Windsor, the foundation was begun, which was to be the site for the largest telescope that had ever been pointed to the heavenly regions. We will not detain our reader by describing the details of masonry, carpentry, and smith’s work, which have occupied eighteen large plates, in the second part of Vol. XXXV. of the Philosophical Transactions, for their explanation, but describe so much of the instrument, and of its appendages, as are useful in making actual observations.

The best view for general representation of the Herschelian telescope, is that which has been given in the Plate 24. of the volume just named, which therefore we have copied into our Plate XXXI. of Astronomical Instruments, with some slight alterations arising out of subsequent improvements or curtailments of unnecessary appendages. This view, taken from a flat to the south-west of the erection, represents the telescope elevated in the meridian line, and affords the means of seeing the front parts of the instrument, and of its numerous appendages; but does not allow the mechanism that supports the inferior end of the tube, and that gives motion in some of the adjustments, to be explained by a reference to their parts, and therefore must be comprehended from a verbal description. The foundation on which the frame-work of the forty-feet telescope is erected, consists of two concentric circles of brick-work, one 42, and the other 21 feet in diameter, both sunk 24 feet under ground, and tapering from the breadth of 2 ft. 3 in. below, to 1 ft. 2 in. above, where they are capped with paving-stones of 1½ inches wide, and 3 thick. In the centre of these circles, is fixed fall into the ground by brick-work, and opposite brances of wood, a vertical beam, as a centre of motion, round which the whole structure may
may have a circular motion in azimuth, the plane of the outer circle being made perfectly level. The platform that connects the different parts of the frame-work below, has three principal horizontal beams lying parallel to each other, and three others lying parallel, crossing the first at right angles, besides various bracing-beams, that tie the whole compactly together, by iron bolts passing through the places of crossing. In our drawing, the outer circle of brick-work and masonry is denoted by the letters A B, and the circumference of the platform of wood by C D: under each opposite end of the six main beams is fixed a roller, of six inches in diameter, and eight long, having each a strong iron frame bolted into the end of its respective beam; so that the outer circle has twelve rollers: but these were not sufficient to bear the whole at 21 feet from the centre of motion; therefore eight more rollers, nearly equidistant, were fixed to strong parts of the platform, so as to be borne by the inner circle of 21 feet diameter; and thus the whole platform, with its superstructure, is capable of making a revolution, when sufficient force is applied round the central vertical beam, that enters a hole at the junction of the two central main beams, and that ascends but a little way out of the ground. Six out of the twelve rollers of the outer circle are seen between A B, the brick-work, and C D, the circular edge of the platform, and the reel may be imagined, not only on the remainder of this circle, but also on the inner circle, which is concealed. In these rollers, it is of great importance that the axes of motion all point towards the central beam round which they carry the platform, and also that their diameters and frames be precisely of like dimensions, otherwise they will not bear alike on the bases of masonry. At twelve feet distance from and all round this moveable platform, are fixed fast into the ground eight equidistant polling, to an opposite pair of which the ends of a long pliable rope are hooked, that give the motion in azimuth; which rope, being conducted over two separable pulleys, fixed upon the platform, at opposite sides of the centre, has its ends turned in the direction of tangents, that point in opposite directions to their respective polling. The middle part of the rope is made to pass round one of the spokes of a large wheel, carried by the platform, before it winds round the axle, so as to coil up both ends of the rope equally; which rope, therefore pulls by both tangential ends alike, so as to apply an equal force at each opposite pulley, while the resistance of the polling produces the requisite motion, without a strain on the centre. This mechanism gives the operator a great mechanical advantage. That part of the platform C, which connects the extreme ends of the three longitudinal beams, over the rollers at A, is made strong, and is the support for a pair of double ladders, that are descending to the summit of the whole frame-work, one on each side of the large tube E; and at D is another similar support for two other double ladders, which, ascending in like manner, meet the former ones, and cross into them in such a way, as to admit of being bolted together at the point of crossing. These ladders are propped by other shorter ladders, as seen in the figure, and some upright masts, of which one is seen erected over the roller at B, ascend in like manner, and afford the means of obtaining horizontal branches at different heights, all round the frame, except where the elevated end E of the telescope requires an opening to be left between the front ladders for its different degrees of elevation. The transverse beam $F G$, which lies horizontally over the crossings of the double ladders, and is bolted to them, receives the hooks of the different pulleys, which we shall shortly have occasion to describe, at the same time that it connects and braces together all the ladders at their upper extremities. These ladders are each 49 feet 2 inches long, so that the height of the transverse beam $F G$ must be $\sqrt{49 \times 49 - 20 \times 20} = 45$ nearly, and will therefore admit of the long tube, of 40 feet in length, to be raised into a vertical position under it. Below the mouth of the large tube, a gallery H I, with its attached brackets K and L, rests upon the tops of the inner halves of the double ladders, at K and L respectively, and may be made to slide up or down, into any state of elevation, by two systems of pulleys, and ropes going round the blocks hooked at the juncture of each pair of ladders, to the transverse beam $F G$, as may be seen in the figure; and when this gallery is lowered to the landing of the pair of steps M, a party may be admitted into it to gratify their curiosity, the floor being 13 feet 6 inches by 6 feet 1/2 inch, and palisaded on the front, as well as partly at both ends. The bafes, or sliding parts of the brackets, are prevented from slipping aside by lateral rollers of brass, acting against the straight sides of the middle pole of each double ladder, while other rollers of the fame metal, acting under them, diminish their friction, when drawn up or let down by the pulleys. In the framing of these brackets, it was necessay to introduce contrivances for allowing some deviation of the gallery from an exact level, in case one of the brackets was elevated by its pulley taller than the other; which contrivances are not easily described without a reference to the drawings of the separate parts in the original account, or without inspection of the parts themselves.

The tube of the telescope, which is 39 feet 4 inches in length, and 4 feet 10 inches in diameter, is made entirely of iron; it having been ascertained that a wooden tube would have exceeded an iron one in weight by at least 3000 lbs. The sheets were first put together by a kind of keening, that requires no rivets; and when the sides of the iron platform were cut straight, it was lifted by proper tackle into a hollow gutter, and then brought gradually, by various tools, into a cylindrical form. Various hoops are fixed within the tube, and longitudinal bars of iron, connecting some of them, were attached to the two ends of the tube, by way of bracing the sheets, and keeping the shape perfect when the pulleys are applied to give the necessary elevation at the upper end, and that the speculum might be kept secure in its bed at the lower end. The hoop by which the upper end of the tube is suspended is eight inches broad, and thicker than the reel; and the fyltem of three pulleys, seen at N, with each a double block, has a corresponding set at O, hooked to the transverse pole $G F$; and the bars to which the blocks are hooked are so bent, that the moving ropes will not come in contact; nor will the elevated tube have its vertical motion disturbed by the tackle, either in ascending or descending, which was an important precaution. The lower end of the tube is firmly supported on rollers, that are capable of being moved forwards or backwards by a double rack, moved by wheels and pinions at R, which we shall not attempt to describe minutely; but the use of which every mechanic will comprehend without particular explanation. Originally there were several appendages near the mouth of the tube sliding by pulleys, or fixed to the tube, for the purpose of regulating the images taken by this instrument; but as the twenty-feet reflector is now used for this purpose, they are taken off, and have been omitted in our drawing. By an adjustment at the lower extremity of the tube, the speculum is turned to a small inclination, so that the line of collimation is not coincident with the longitudinal axis of the tube, but crosses the tube diagonally, and meets the eye in the air, at about two inches from the edge of the tube. Hence no part of the head intercepts the incident rays, and the observa-
TELESCOPE.

The author has called, by way of illustration, the front view, the back being always turned to the object to be viewed. Besides the pulleys of elevation, and azimuthal motion, there are others for the purpose of communication, as well as speaking-pipes, repeating-bells, and signals by clock-work, which cannot be clearly comprehended without inspection, or numerous drawings to be referred to; but the dexterity of the observer has rendered some of these superfluous. The large speculum is enclosed in a strong iron ring, braced across with bars of iron, and an enclosure of iron and tin plates makes a case for it; it is lifted by three handles of iron attached to the sides of the ring, and is put into and taken out of its proper place by the help of a moveable crane, running on a carriage, which operation of course requires great care. Three small vanes attached to the edge of the tube at the mouth, assist to put the line of collimation right, when they are seen reflected from the speculum to the eye-piece. We visited Slough late in the year with a view of examining all the minutiae of the magnificent apparatus that is rendered necessary for the management of this huge telescope, and that can only be well described on the spot, and found the substance of a letter written by the late Mr. Smeaton on this subject, immediately after a visit for the express purpose of inspecting the apparatus then in existence, so accurate, that we avail ourselves of this source of information; and as the letter which is before us is a copy taken from the writer's own manuscript, we have no doubt of its authenticity. It relates however principally to the twenty-feet instrument.

Gray's Inn, Nov. 4th, 1785.

"My dear friend,

"Since my last, I have been to pay my visit to Mr. Herchel, and according to my promise, proceed to give you some account of what I have seen; and indeed he has so much originality about him, as well as natural ingenuity, accompanied with great readiness and dexterity, that to enter into the detail would be far to exceed the bounds of a letter; I will therefore enter into the great outlines, and fill up as I can. You must know that, till this visit, I have held the doctrine about telescopes that I believe is the common one; that, having fixed upon a proportion that you by experience find to do well in any one species of telescope, what you are to expect from any other size of the same species, is in proportion to the square root of the length; so that increasing the length four times, your telescope will allow you to take an image of the double diameter; every point of it being illuminated with the same quantity of light, and painted with an equal degree of distinctness and precision. This idea and expectation I carried with me to Thornhill, and carried the same to Clay-Hall; but I did not bring it back with me. Mr. Herchel's doctrine will illustrate his pursuits better than minute descriptions. Whatever his doctrine originally was, experience has taught him that large surfaces of speculums are not to be ground and polished so as to preserve so accurate a figure as those of a small or moderate size; he therefore divides the maximum that telescopes may be expected to bring out, into three distinct classes: first, the greatest possible degree of magnifying power, where there is a sufficiency of light; secondly, the greatest degree of distinctness, where there is also a sufficiency of light, but where the natural size of the object does not require the greatest degree of magnifying power; thirdly, the greatest degree of light, where the objects are naturally obscure, which will afford discoveries that cannot be brought out either by great degrees of magnifying power, or a capacity of distinctness, where, on these accounts, a sufficiency of light is wanting. In conformity with this doctrine, his principal discoveries have been made upon the stars, where the greatest degree of magnifying powers have been required, and used with his original telescope of seven feet focal length, which he has pulled to between five and seven hundred times. The greatest discoveries have also been made with these, where the greatest distinctness has been required, and a moderate degree of magnifying power; the diameter of the speculum of this telescope being no more than 6½ inches: and also, for the same purpose, he finds his ten-feet telescopes applicable, the diameter being 9 inches; but for objects naturally obscure, he can distinctly see an object with his twenty-feet telescope the diameter 19 inches, (which is seldom charged with a magnifying power of more than 200 times,) which the others will not reach. With this telescope he is now and has been for some time past at work, as he calls it, fusing the heavens. The whole apparatus can upon occasion be turned to any azimuth, but is chiefly used with the telescope turning in the plane of the meridian. The inferior or speculum end of the tube is supported immediately upon the ground; the other end of the tube is raised and lowered by a tackle, supported at top upon a double equilateral triangle (or thereabouts); the observer is also hoisted up in a chair, that works on rollers, upon the inclined legs of the triangle next the eye-glass; and the eye-glass is brought to answer to this straight line by sliding the butt of the telescope near the centre of the whole machine; and by the same means it can be put into a vertical position. The raising the chair and the sliding of the butt are done by separate tackles respectively, touched only occasionally; but the main tackle that raises the telescope, when brought to its intended elevation, that is, polar distance, is worked by a distinct motion, that causes it to rise and fall alternately through a space of two degrees of the meridian, which being done with some degree of briskness, a plot in the heavens is examined at once of two degrees broad, the motion of the heavens in AR bringing on the objects in succession. By way of regillar, large sheets of paper are prepared, marked and numbered, being ruled into parallel long and cross lines at a quarter of an inch distance; a small square of this kind representing a quarter of a degree in AR and declination; all those that are examined being marked with a cross, and those that have been seen, but not fully examined, with a stroke one way; and when afterwards seen to satisfaction, the cross is completed. The place and species of the object are also marked upon the paper. In this operation, three persons are concerned; a labourer works continually the handle backwards and forwards for performing the defined range; and in this he is prevented from ranging too little or too much, by a small piece of machinery, that strikes a bell at each end of the range; he also stops on notice: and if any thing comes requiring this notice, and the object to be pursued, the telescope can by an apparatus, which occasionally heaves it from its meridian bearing, pursue it in right ascension for a quarter of an hour; and that there may be no need for the observer's eye to be taken from the eye-glass, an assistant (Mr. Herchel's sifter) fits in an adjacent room with the squared sheet before her, who notes down and in a book writes what is inscribed. The time the has by the clock facing her, and the polar distance by a piece of machinery, which continually thows the degree and minute, and is worked by a spring actuated by the telescope in rising and falling, which comes into the room, and winding round a barrel, performs the requisite motions. The telescope is set to its altitude.
TELESCOPE.

The speculum of the great telescope of 40 feet is cast, but was not yet made; it is four feet diameter, and about 1050 lbs. weight. Mr. Herchel tells me there is a warehouse in Thames-street, where they keep for sale metal ready made into ingots, of which they have two lots, for what they call white metal and bell-metal; I suppose each of the bells of clocks are made of, but he did not exactly explain his composition; for his speculum, they put two ingots of bell-metal to one of white metal. He thinks it a lower metal than what he used for his former specula of 19 inches, viz. 7½ ounces of tin, to 20 ounces of copper. I am not sure, however, whether I remember right, but you probably will guess. He does not propose it to magnify more than the present one of 19 inches, but to take the whole advantage in light, he makes all his specula flat upon the back side. The thicknesss of this last great one at the edge was to have been two inches, but by some shrinking in the mould, and particularly in the middle, I understand it is not there above 1½ inch, and also less at the edge than it was to have been, so that it is hollow in the back as well as face; but as it came pretty well upon the face, he promised to make use of it; and when he had not thus furnished, he promises to cast another, having duplicates of all he makes, so that while one is in use, another can go to the polisher. They are made to be enclosed in brass boxes, and their weight lays upon several thicknesses of cloth, and are polished in these boxes, and are made to go in and take out fo conveniently, that they are very frequently put into their tubes and tried with an object while under the operation of polishing; and to these frequent trials he ascribes the principal cause of his successful in these operations.

I remain, dear sir,

ever yours,

J. Smeaton.

We have only to add farther, on this subject, what we learnt in a conversation with Sir William Herchel, that he prefers single lenses, before what are called achromatic eye-pieces, from an idea that more light is thus had for both his 20 and 40 feet reflectors, and that greater power may thus be obtained for his smaller instruments. We have, however, to regret, that his mode of giving the parabolic curve to the great speculum, by mechanical means, must for the present remain a secret, for the discomfiture of which we feel that we have no right to ask, while there is an existing manufactory that might be injured thereby. The peculiar advantage of the Herchelian construction is, that there is no light lost by a second reflection, and that the large quantity of polished surface reflects more rays than can be collected by any other means. The weight of the metal, which is very brittle when of the bell mixture, made it necessary to have a prevailing portion of copper in the large speculum, which is, therefore, liable to be the sooner tarnished, and to require more frequent polishing than would have been requisite, if the bell proportion for bright-nefs could have been preferred in the ingredients of the compound metal: but what is defective in quality, is compensated by the quantity of polished surface. It is hardly necessary to inform the practical astronomer, that when the greatest powers are used, both the light and the field of view, and consequent time of apparent passage through the field, are proportionally diminished. We underfoold the ingenious and dextrous observer to say, that instruction and practice are necessary to enable any other person to follow a star or planet with the forty-feet reflector; for that a heavenly body seen with one of the highest powers does not continue in the field more than a few seconds of time, unless the motion of the tube is regulated so as to keep pace with the apparent motion of the body; and this is probably the reason why few persons have been in a situation to form an estimate of the merits of this transcendant instrument. For the detail of all the parts, see vol. lxxxv. of the Philof. Tranf. of London, part ii. 1795.

5. On the Powers, &c.—After having described the most convenient contructions of a telescope, of both the dioptric and cata-dioptic kinds, we proposed to shew how their powers may be practically varied and estimated. We have already seen, in our feccion on the theory of telescopes, how the powers may be calculated, when the focal distances of the glases are known. In telescopes with one object-glafe, or concave speculum, and one eye-glafe, the focal foci of which may be called $F$ and $f$ respectively, the power $P$ may be always expressed by $F + f = f$; but $F$ varies inversely with the distance of an object viewed, while $f$ remains the fame, therefore the power $P$ will vary also inversely with the distance.

So long ago as in the year 1740, Benjamin Martin, to whose ingenuity the practical opticians of the present day are much indebted, proposed to determine distances at one fitation by this variation of power in a long telescope; but as the distance increased, the proportional elongated portion of the sliding tube containing the eye-glafe became so small, that the scale was too limited to be of any real use. We mention this circumstance, merely to shew that the fame telescope with the fame glases has its powers naturally varying with the distance, but in an inverse ratio, until the incident rays become parallel in consequence of the great distance of the radiant object; hence we may account for the reason why the famous Short attributed to his telescopes powers which they did not possess, when directed to very distant objects.

But, generally speaking, when we fay that a telescope magnifies fifty times, we are understood to mean, that it enlarges the diameter of the fun, or of some distant object, so many times; because in this cafe $F$ and $f$ remain both unaltered. (See LENS, 5.) But when the object viewed is at no great distance, calling the elongated portion of the focal focus $c$, and the distance $d$, Martin has fhewn that

$$c : F :: F : f : d; \text{ or that } \frac{F + c \times F}{c} = d;$$

he proposed to determine the quantity of $c$ in all situations by mechanical measurement. Now supposing the power to be considered as always determined from the focal focus of an object-glafe or speculum, in telescopes of the simplest construction, this power, where the object-glafe or speculum remains the fame, can be increased only by shortening the focus of the eye-glafe or eye-piece, when it is composed of two glases; but there is a limit in the power of dioptic telescopes constructed with single object-glaifes, which depends on the prismatic and spherical aberrations, beyond which limit indefiniteness takes place; and even in good achromatic and reflecting telescopes, the eye-piece may be shortened until a deficiency of light renders the increased power of little use, and thus fixes a limit to useful power.

After a power is fixed on, in the use of a simple telescope,
scope, such as admits of sufficient light, and allows a field of view large enough to contain the images of the object to be examined, the magnitude of this power may be ascertained by different means. Besides \( \frac{F}{f} \), which expression is better calculated to explain the theory than to define the practical result; for it is not an easy matter to measure precisely the exact compound polar focus of an eye-piece composed of two glases, nor yet that of a single lens, when its focus is short, and consequently its substance considerable in thicknesses. Neither is it easy to obtain the exact power of a terrestrial eye-tube constructed on the principles of a compound microscope. The first practical method of measuring the total power of a telescope, that we shall describe, is extremely simple, and is applicable to telescopes of all constructions, however complex the calculation by theory may be, and gives the result with very little trouble. Whatever be the diameter of the object-glases or speculum of a telescope, in inches and parts, the diameter of its image, or luminous disc, formed in the anterior focus of the eye-piece, by the condensed rays, will bear the same proportion to that diameter, as the focal length of the eye-glases or glases jointly, bears to the focal length of the object-glases or speculum; these diameters, therefore, may be substituted for the two foci of the respective glases, or speculum and its eye-glases, in determining the power. Different methods of measuring the luminous disc have been proposed; a nicely divided slit of mother-of-pearl, fixed in a small piece of tube bearing a magnifier at the opposite end, forms a simple instrument, which has been called the pearl dynameter, (from διαστάσεως, of power, and μετρόν, a measure,) and which answers the purpose very conveniently, when sliding within another short tube for the sake of adjustment, as seen in fig. 9. Plate XXIX.

Suppose that the disc of a telescope, with an object-glases of 3.25 inches diameter, measures \( \frac{3.25}{.06} \) = 54.4 is the power required to be measured; and if the same disc had been measured with a reflecting telescope of 7.5 inches diameter of the large speculum, whatever its construction in other respects, the power would have been \( \frac{7.5}{.06} \) = 125. The correctness of this simple method will depend on the accuracy with which the respective diameters of the disc and object-glases, or speculum, are taken, and the distance to which the telescope is adjusted for distinct vision. The powers of the four achromatic telescopes, for which we have adapted our Tables I. and II. in the next section, were taken in this way, when Troughton's micrometer was applied as a celestial eye-piece, and were determined to be as follows: viz.

In 30.15 focus \( \frac{2.05}{.0663} = 30.5 \) = power.

45.75 ditto \( \frac{3.3}{.077} = 45.3 \) = ditto.

63.5 ditto \( \frac{3.5}{.0512} = 63.5 \) = ditto.

118.8 ditto \( \frac{3.00}{.052} = 120.0 \) = ditto.

These powers, if the data had been taken with perfect accuracy, would have been respectively to each other as the focal lengths of the object-glases directly, which they are nearly, or inversely as the values of the micrometrical screw, which values have been tabulated, as will be seen in our subsequent section; therefore, when the power of one of the telescopes is obtained accurately by the pearl dynameter, the powers of all the others may be had from the micrometrical values, by reciprocal proportion. Before, however, the dynameter is used, it will be necessary to adjust the eye-piece to distinct vision when viewing a remote object, otherwise the disc will be too small, and the power larger than when celestial observations are taken. Also, to avoid mistaking the anterior glases of the eye-piece for the disc or diminished image of the object-glases, a slip of paper may be stuck on the centre of the exterior face of the object-glases, the image of which will appear on the centre of the disc, and affix the adjustment of the dynameter to its true place of distinct vision, which is essential at the moment of taking the exact measure of the disc. If one of the celestial eye-pieces has got a divided slip of pearl, as recommended by Cavallo, to be used as a micrometer, the interior lens may be taken out, and then the eye-piece will become a dynameter for measuring the powers of all the other eye-pieces, whether celestial or terrestrial, in the way we have here described; but it will be more convenient to use one with a sliding tube of adjustment for distance, as made by T. Jones, of Charing-Cross.

As this dynameter has lately been constructed in an improved manner, by the maker we have just named, and as it has never been described, we will here give our readers a short account of its improved construction. Fig. 9. of Plate XXIX, represents this neat little instrument of nearly its full size, where a, b, and c, are so many small tubes within one another; the shortest tube, a, contains the two plano-convex lenses f and g, which constitute what we have called the positive, or Ramfden's eye-piece, with the two curved faces opposed to each other; and as this eye-piece is inserted into the tube b, near the end, it may be regarded as a part of this tube, when screwed into its place: the tube b has a slip of the mother-of-pearl, d d, very delicately made, and screwed fast across a diaphragm near its remote end, at such a distance from the lens g, that the screw of the eye-piece a will adjust the pearl for distinct vision, as an object in the compound focus of the eye-piece, for any eye that may have occasion to use it. The slip of pearl is divided into such minute parts, that 500 of them are equal to an inch, and yet the eye-piece has power enough to give a clear view of them, and to enable the eye to count the dividing strokes, of which every fifth is of double, and every tenth of four times the length of the subdividing strokes. When the scale is rendered clearly visible and legible, by the screw of adjustment, the tube b is inserted into the outermost tube c, which has a diaphragm and covered hole at e, and when this hole is uncovered, tube e is brought into contact with the eye-piece of the telescope, centre to centre, so as to receive the pencil of condensed rays, that usually enters the eye of a spectator; then, if the image of the object-glases of the telescope formed at the place of the eye, is not well defined on the slip of pearl, tube b must be pushed into tube c, till this will be the case, and then the number of divisions and sub-divisions of the pearl scale, that the little luminous circle exactly covers, will give the power required; and if the number read be doubled, because they are 500th parts of an inch, they will then be so many parts out of 1000, and will therefore be decimal parts of an inch; the denominator being confidered = 1000.

Another method of ascertaining the powers of a telescope, when a dynameter is not at hand, is by what is called false vision, which requires a little practice before it can be applied with success. By this method, one eye views the magnified image of a distant object in the telescope; and the
the other eye, being also used, but out of the telescope, projects that image upon a horizontal line, bounded by some observable distinct marks, that can be known again: then as often as the angle subtended by the place of observation by the object, of which the image was observed, is contained in the angle subtended by the horizontal line into which it was projected, so much does the image apparently exceed the object; i.e. so much does the telescope magnify. For instance, suppose that forty bricks in the wall of a distant building appeared just to occupy the whole field of view of any telescope, and that the angle subtended by those bricks measured 50', by any other instrument, which would be the case at the eighth of a mile very nearly; then suppose that the horizontal line covered by the forty magnified bricks, or by the luminous circle of the field of view, was bounded by two trees, and subtended an angle of 41° 40'; on these suppositions, the power would be \[ \frac{41° 40'}{50'} = 50: \]

The power of the four telescopes with the same eye-piece, which we have before mentioned, were taken again by this second method, and found to be as in the subjoined statement: viz.

| 30.15 focus | 68' \( = \) 30.9 |
| 45.75 ditto | 68' \( = \) 14.5 |
| 63.5 ditto | 68' \( = \) 10.5 |
| 118.8 ditto | 68' \( = \) 5.4 |

In taking these measures, it was found convenient to make use of the space included between the two spider's lines of Troughton's micrometer, instead of the whole field of view; which substitution not only prevented diffusion, by confusing the objects to the middle of the field of view, but diminished the angle to be projected within the dimensions of the pupil of the eye, so that the head did not require to be turned from its first position in making the projection. Two painted lines were stuck into the ground at about 700 feet from the eye, at such a distance from each other, that they could both be seen within about one-half of the field of view; the spider's line were then opened till they coincided with the two lines, when projected upon them by fable vision, and the value of the revolutions was then found to be as above stated. This was done with the telescope of 30.15 inches focus; but the same projection would have taken place at the opening of the lines, of any of the other three telescopes at the same distance from the lines; therefore it was not necessary to repeat this operation with the other telescopes, because the repective values of the same opening, or number of revolutions, are given in our Tables I. and II., as will be seen presently, for all the telescopes, as so many divisors for the common dividend. Thus Troughton's micrometer may be used with great advantage in determining the power of any telescope to which it is adapted; and even Cavall's may be substituted for the same purpose, when that eye-piece is used to which it is appropriated. But the most convenient, as well as most accurate, dynameter that we have seen, is that which has an eyeglass divided, so as to form two images of the luminous disk, when the centres of the semi-lenses are separated by a screw with a divided head. This double-image dynameter was invented by Ramdén, probably soon after Dollond's object- 

The elegant and useful little instrument has not been described; we shall, therefore, make a short account of it in this place. Fig. 12. Plate XXIX. of Astronomical Instruments, represents the exterior appearance of Mr. Dollond's construction, and fig. 14. its parts, when the covering plate is taken off; in both of which figures the same letters refer to the same parts. The frame that contains the screw is denoted by a, and b, the interior or sliding-tube of brafs, made fast to the said frame, having the divided lens at the eye-end, near the letter of reference a in fig. 12; and c is the outer tube, which is placed in contact with the outermost eye-glass of the telescope, when the luminous disk is to be measured, and admits of adjustment of the tube b to different vision of the difc: a is a milled head of a concealed screw, which separates the two semi-lenses until the luminous disk is seen double, with the opposite edge of each disk nearly in contact, as in fig. 13: e is the divided head of the screw, or micrometrical head, with 100 divisions properly numbered; and f is the scale for indicating the number of revolutions of the screw, as the divided head e does the parts of a revolution. The axis of this screw is made fast to the frame, so as not to move from its situation while it revolves, and is of bell-metal; it is made hollow within, and is tapped to a thread of the same fineness as that of the exterior screw; then a smaller screw of steel enters the tapped tube, as seen in fig. 14, and has its other end pinned fast to the piece of brafs g, at the point g', which piece carries one half of the divided lens, while the other half is carried by a similar piece, b h, to which the scale f is also screwed fast. The foot-piece of b h is tapped, so as to receive the thick screw of the axis; and a bent spring of metal, e, bears against both pieces, g b and b h, so as to keep the screws connected with them free from shake. During this description of the concealed parts of the frame, the mechanical reader will have anticipated, that when the micrometer head, and nut d, made fast to the axis of the thick screw, turn together in the direction that makes the figures increase, the thick screw will draw the piece b h, and with it the scale f, and one semi-lens, towards the nut; but as the small screw of steel is a left-handed screw, i.e. has its thread winding in a contrary direction, and is fast to the piece g b, it will recede from the nut, and take the other semi-lens in a contrary direction, so that the centres of the semi-lenses will separate with a velocity equal to the sum of the contrary motions of the two semi-lenses; and as these centres recede, the original disk will become a double disk, as in fig. 13, and may by separation be made two disks, when the semi-lenses are removed to their greatest distance. Hence, when the value of one revolution is known, the amount of any given number of revolutions and parts is had, as being multiples of that revolution. In the dynameter before us, there is a disk of thin horn or ivory, just \( \frac{1}{16} \) of an inch in diameter, in the sliding-piece that closes the aperture of the exterior end of tube e; and five revolutions of the screw julk divides this disk into two contiguous ones, so that each subdivision of the micrometer e is just \( \frac{1}{80} \) of an inch, and when doubled, may be put down in decimal numbers. But there is another use of the horn disk, besides that of giving a value to the micrometer; it fo
so much resembles the luminous disc formed by the image of the object-glass which is to be measured, that the mode of dividing this disc by the screw may be illustrative of the mode of application to the measurement of the actual disc formed with distinct vision, by the refracted rays that have passed through the eye-tube of a telescope.

This instrument, besides, a pleasing microscope not only for viewing, but for measuring too, the real dimensions of any microscopic object; and when applied to a nicely divided scale, it may be ascertained whether or not the horn disc is exactly $\frac{1}{2}$th of an inch in diameter; viz. whether or not five revolutions of the screw will bring the fringes that include $\frac{1}{2}$th of an inch into exact agreement coincident; for if not, a correction depending on the excess or deficiency must be applied to all measures of a luminous disc, that are to determine the total power of any telescope; or otherwise the two lenses of the eye-piece must have their distance between them so adjusted, that five revolutions will exactly measure $\frac{1}{2}$th of an inch; for, as the two semi-lenses, when brought to have their centres coincident, constitute one of the two lenses of a positive eye-piece, as in the pearl dynameter, and as in Troughton's micrometer, we have shown that altering the distance between these lenses, will alter their compound focus, and consequently their magnifying power, on which the apparent magnitude of the luminous disc depends. In using this instrument, the eye is applied above the centre of the tube $b$, over $a$ in fig. 12, and the tube $c$ is used, as in the pearl dynameter, for adjustment for distinct vision of the discs.

When Ramsden first made the double-image dynameter, as now constructed by Mr. Dollond, and as we have here described it, he found that there was some play in the screws after they had been in use for some time, so that they would not immediately obey the direct and retrograde motions of the nut $d$, and that the loss thus arising affected the measure by the semi-lenses, which did not move contemporaneously; but in the instrument under our examination there is no fault of this kind.

The dynameter which Ramsden considered as on an improved construction, as it regards the imperfection just noticed, is now made by his pupil Thomas Jones, who, we have said, has also improved the pearl dynameter already described. Figs. 10, 11, and 12, represent the interior parts of Thomas Jones's dynameter, which we have also before us; there is no frame $a$ here, but the tube $b$ contains the lenses of the eye-piece, of which that next the eye is divided, as in Dollond's instrument; and the tube $c$ is the same, except that it carries a lens $k$, with which the divisions on the scale $f$ are read, when the dynameter has its position reversed, after the measurement is finished. The nut $d$, and divided head $e$, are also the same as we have described; but the semi-lenses are not fixed in sliding-pieces of metal, such as we have described; neither is the screw similar to what we have above noticed. Within the tube $b$ is an interior tube of much smaller diameter, and nearly of equal length, which is divided longitudinally into two similar halves, which turn on separate pivots in a gimbal, or moveable ring, within the remote end of the tube $b$, and each semi-lens is fixed in the nearer end of its own semi-tube. These semi-tubes are marked $m$ and $n$ respectively in fig. 13, and one of the pivots in the ring is at $e$; the other being at the opposite end of the diameter of the ring: the extreme ends of the pivots turn in the tube $b$. The fiction of the semi-tubes, holding the semi-lenses, is seen in fig. 11, together with the micrometer head and nut. The axis of the screw is of bell-metal, and solid: the end nearest to the micrometer head has threads of double fineness to the end within the tube, and the action is so ingeniously contrived, that the semi-lenses are moved in contrary directions by the same screw, notwithstanding the threads all incline one way. The cylindrical nut $g$ is tapped for the finer thread; and as this nut is screwed on to the tube $b$, as seen in fig. 11, more plainly, the forward motion of this axis has its velocity guided by this fine part of the screw; and the end that enters the tube, profiles against a fluid, made fast to the semi-tube of the semi-lens; and a longitudinal counterring spring conceded in tube $b$, and made fast to it at the lower end, allows the semi-tube to recede, but profiles it close to the end of the screw; then another fluid, made fast to the semi-tube of the semi-lens, is tapped for receiving the coarser thread on the axis of the same screw, which thus gives a double retrograde velocity to this semi-tube, compared with what it receives from the push of the finer screw; and as there are two threads in the fine screw for one in the coarse one, and as both are cut on the same axis, the apparent motion of the semi-lens $z$, is actually the difference of two contrary, but contemporaneous motions; and these motions are so slow, that five revolutions are equal to $\frac{1}{2}$th of an inch, and consequently the reading is in decimal numbers already.

Otherwise, this dynameter is applied exactly as we have above explained.

Besides these dynameters, we have examined a double-image one by Dollond, in which the micrometer head was divided into forty parts, and in which the ivory disc was only $\frac{1}{2}$th of an inch, so that 250 revolutions measured the disc, and a double measure might be obtained by making the contact of the two discs first to the left and then to the right, in order to make the error of zero vanish, in which case half the sum of the two measures was the true measure corrected for the opposite errors of zero, and the graduated circle or head of the micrometer turned off on the axis of the screw for adjustment to zero. This instrument professed to have $\frac{1}{2}$th $= 200$ divisions in $\frac{1}{2}$th of an inch, and consequently only $2000$ in an inch; but on examining the value of a revolution with a fine scale, we found that 198 divisions measured $\frac{1}{2}$th of an inch; we will therefore exemplify the use of this instrument, by shewing how the correction for the imperfection of the scale may be applied in actual practice.

In the first place, the screw is turned in a retrograde direction until contact of the two discs takes place to the left of the original single disc; in this situation the 40 on the divided head must be put to zero, or the lozenge marked as a pointer to the micrometer head, and the clock indicated on the small scale $f$, by another lozenge or index, must be noted; then turn the screw, first till the two discs unite in one, where a single measure might be taken, and then till they are again in contact to the right; in which situation, the whole diameter of one disc will have crossed the whole diameter of the other, and therefore the screw and its parts will give a double measure of the real diameter. In an actual trial of a telescope, this double measure was found to be two revolutions of the screw, and 37 parts of the head, or $\frac{1}{4}$ of another revolution; and on an average of several trials, $\frac{1}{2}$th of an inch was found not exactly equal to 200, but to 198 of the divisions of the head, as we have stated above; then $\frac{1}{4}$ of $\frac{1}{2}$ of an inch was the double measure of the disc; or $\frac{1}{4}$ of $\frac{1}{2}$ of an inch was the single measure; and the diameter of the object-glasses being 3.24 inches, we have the power $= \frac{3.24}{0.209} = 15.32$; with great correctness, the telescope having been previously adjusted for viewing the solar spots. This was the determination of the power of our telescope of 63.5 inches focal distance, when No. 4. of the celestial eye-pieces was on; and in the same way all the other powers, celestial or terrestrial,
TELESCOPE.

Trial, may as readily be obtained. T. Jones's construction is however more convenient for use, and is more accurate, though it measures only one dist, unless the power be great, and consequently the slide small. The divided head is fixed with the axis of the screw, and is divided into 100 parts, 50 of which measure exactly 1/4 of an inch, so that the inch is sub-divided into 10,000 of these parts, and the decimal numbers are read off at once without calculation; thus, when the slide is adjusted to appear single and well defined, the index, which is the edge of the scale, stands at 100, or zero of the micrometer head, and the edge of the circular rim of the head is coincident with the first stroke of the scale; but when one revolution of the screw has taken place, the said index is found coincident with the second stroke of the scale, and so on, as the divided head revolves; when the two slides were brought into contact, the quantity indicated, as seen through a lens k, was 2.95, viz. two revolutions, and 13 3/5 on the head of the screw; but in this instrument, five revolutions, we have said, are equal to 2 3/4 of an inch, and therefore one revolution = 13 3/5, consequently 102 3/5 or 0.0255 of an inch, is the measure, as before; so that all that is requisite to do, in registering the measures taken with this instrument, is to prefix a cipher to the figures read off by inspection, and then the decimal quantity, or divisor, is had, without further calculation, for the telescope of any aperture, either dioptric or cata-dioptric, and of any construction.

In both Dollond's and T. Jones's dynameters the slide is seen without distortion and without prismatic colours, and the instrument forms a single microscope of the most useful kind; for, by the latter in particular, small objects may have their dimensions taken to the accuracy of 1 1/50 of an inch, and at the same time the figures may be had by inspection, from the scale and its parts, to form places in decimals when a cipher is prefixed, as we have above explained. The powers of our four telescopes, with the eyepiece of Troughton's micrometer, were found by T. Jones's double-image dynameter agreeably to the subjacent statement; viz.

<table>
<thead>
<tr>
<th>Dia.</th>
<th>Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>30.15 focus</td>
<td>30.6 = power.</td>
</tr>
<tr>
<td>45.75</td>
<td>45.6 = ditto.</td>
</tr>
<tr>
<td>63.5</td>
<td>64.5 = ditto.</td>
</tr>
<tr>
<td>118.8 ditto</td>
<td>119.0 = ditto.</td>
</tr>
</tbody>
</table>

In all the three determinations of powers, the adjustment for vision was to a distant terrestrial object, and consequently there is somewhat too great. From the experience we have had of these different modes of ascertaining the powers of a telescope, we have no hesitation in giving the preference to the double-image dynameter, in which the two images may be brought into very nice contact; whereas in the pearl dynameter, which is also very good, something is always left to imagination in taking the fractional part of a division; and when false vision is used, the adjustment of the eye to different distances, one within the telescope and the other without, at the same time, leaves considerable uncertainty in the size of the projected field of view, which will vary according to the state and position of the eye in every trial. We mention this last circumstance as worthy of consideration, because several micrometrical determinations of the distance between double stars have been made, particularly by Dr. W. Herchel, where the power of the telescope determined by false vision is made in effect the scale of the measure; consequently if the power is not accurately alligned, the measure of the angular distance depending on it will be proportionally erroneous. Astronomers, we repeat, are yet in want of an unobjectionable mode of measuring the angular distances of very small double stars, which cannot be done when extraneous light is admitted into the telescope, and which therefore have hitherto been projected on two luminous points, placed at measured distances from each other, for the purpose of ascertaining the apparent celestial interval in its magnified state, from a comparison with a known terrestrial interval in its unmagnified state, which method is liable to considerable uncertainty, and can only be admissible upon the principle of its admitting of an average taken from a succession of measures under different circumstances.

We have already explained, in our preceding section, how the powers of any telescope that has a terrestrial eye-tube, may be varied by the application of the celestial eye-pieces to the eye-end of this, by the help of adapters, and therefore we shall only say further on this part of our subject, that however the power is varied by changes of position of the eye-pieces, or by additional field-glasses, any of the dynameters will give the total power, under any of the dispositions, by the simple measurement of the slide, which we have explained; but should there be any doubt about the exclusion of the rays incident on the extreme circular edge of the object-glasses by the diaphragm, or by Troughton's new illuminator, a measured circle, or long strip of paper, stuck to the face of the object-glasses, must equally be substituted for the glass itself, which we were obliged to do with three out of the four of our telescopes, and then its image at the eye must be substituted for the slide, that we have hitherto described as the true image of the glasses itself, which it will be only when all the rays are transmitted and refracted to a focus at the place of the said slide or image.

In all refracting telescopes, that are not achromatic, of which indeed very few are now made, the indistinctness of an object is directly as the area of the aperture, and inversely as the square of the focal distance of the eye-glasses, when this is small, because the aberrations are proportional to the square of the field; but in a reflecting telescope, the indistinctness will be, with spherical curves, as the fifth power of the diameter of the large speculum directly, and as the fourth power of its focal distance inversely, and also as the square of the focal distance of the eye-glasses inversely.

The light in any telescope, refracting or reflecting, if we disregard what is lost by reflection, is directly as the squares of the linear apertures, and inversely as the squares of their linear amplifications.

In refracting telescopes of various lengths, not achromatic, a given object will appear equally bright and distinct, when their linear apertures, and the focal distances of their single eye-glasses, are severally in a subordinate ratio of their lengths, or focal distances of their object-glasses: and then also their linear amplifications will be in a subordinate ratio of their focal lengths. But in reflecting telescopes, and in the best achromatic refractors, of various lengths, a given object will appear equally bright and equally distinct, when their linear apertures, and also their linear amplifications, are as the square-square roots of the cubes of their lengths; and consequently when the focal distances of their eye-glasses are also as the square-square roots of their lengths. See Smith's Optics, p. 140, et seq.

6. Measures taken by Micrometrical Telescopes.—Though the primary use of a telescope is to render a distant object visible,
visible, by amplifying the visual angle, yet its application to the measurement of small angles was an object that engaged the astronomer's attention at no great distance of time from its invention. When the apparent diameters of the planetary bodies had once been increased, so as to subdue an appreciable angle at the eye of the observer, it soon became a matter of interest to measure these angles in their enlarged state. We have already given the description of the different micrometers that have been successively applied to a telescope for the purpose of measuring minute angles, and terrestrial distances corresponding thereto; but we have reserved our account of the means proper to be used in these operations, as constituting a portion of our present article.

We propose to illustrate the use of a few of the most accurate and useful micrometers by such examples, as will suffice to render the application of any other micrometer intelligible.

When an object to be viewed is remote, the rays of light which proceed from it may be considered as coming from it in parallel lines, and in this case the focus of the object-glasses, or speculum, is the shortest possible; consequently, the power of the instrument depending on this focal distance, is the smallest possible with the same eye-piece; but the rays which proceed from a near object, come to the object-glasses or speculum diverging, and consequently do not come to a focus so soon as in the former case; so that the power is greater than when a diffused object is viewed. This variation of power depending on the distance of the object viewed, is accompanied by a new adjustment of the eye-piece for distinct vision in every telescope of considerable magnitude; and the longer the focus of the object-glasses is, the greater is the variation of power with the same variation of distance. Hence the angle that is measured by any of the micrometers attached to a telescope, is the true angle only when the object subtending that angle is remote; and a correction, depending both on the distance and focal length of the telescope, becomes necessary for converting the apparent measured angle into the true one. To a want of attention to this circumstance in the practical application of micrometrical telescopes to the measurement of terrestrial distances, is principally to be attributed the failure of their success; and celestial objects have consequently engaged their utility almost exclusively. We conceive, therefore, that we shall render our readers an acceptable service by shewing, not only how small celestial angles may be measured by a telescope fitted up with an accurate micrometer, but also how terrestrial angles, subtended by objects at various distances, may be ascertained, and their corresponding distances be obtained with great accuracy; and that by simple vision at one station, when the distance is not very considerable. The composer of the present article has made experiments with different micrometers adapted to telescopes of various lengths, and can therefore illustrate the theory by actual examples in sufficient variety.

Celestial Measures.—When a micrometer of any description, mechanical or optical, is proposed to be used with a telescope, it is necessary that the value of one of its divisions be ascertained with that identical telescope when viewing a remote object, such as a heavenly body; or otherwise, that a correction for distance be applied previously to the determination of such value. We will first suppose the object at a sufficient distance to require no correction for want of parallelism of the rays of light, and will shew how to appreciate the micrometrical scale for such remote distances without correction. The diameter of the sun has been so well ascertained by actual measurement of the best instruments, from month to month, and from year to year, that it may be taken from the Nautical Almanac, or Connaissance des Tems, on any given day, as a standard, from which the value of a corresponding number of divisions on the scale of the micrometer may be determined with great accuracy, after allowance is made for apparent variation in the sun's diameter by altitude, and when the number of minutes and seconds corresponding to a certain number of divisions on the scale is ascertained, the value of one division is readily obtained by dividing the whole number of minutes and seconds by the whole number of divisions that measure the said quantity; and then whatever may have been the error of the observation, as affecting the whole scale, the quantity of it belonging to one division will be only $\frac{1}{60.65}$, or $\frac{1}{60}$ of the whole, accordingly as there were 30, 45, or 60 divisions in the scale that corresponded to the correct diameter of the sun. For instance, on the 7th of August 1815, the sun’s diameter was measured at noon by a Trongilton’s micrometer, attached to a five-foot refracting achromatic telescope made by Tullely, and was found to be equal to 60.65 turns of the screw, when taken in a vertical direction, while the sun passed horizontally between the two parallel spider’s lines in the focus of the eye-piece. In this situation the altitude of the sun was so great, that the difference between the refractions of the upper and lower limbs was insensible, and therefore may be neglected in the calculation of the value of the scale of notches that indicate the revolutions of the screw. On this day, the semi-diameter of the sun, as given in the Nautical Almanac, was 15' 48", and the notches corresponding to the sun's diameter were 60.65, or 60 entire notches, and were taken from the divided head of the screw; then $\frac{15' 48"}{60.65} \times 2 = 31'.27$ is the value of one notch, or revolution of the screw, according to this observation. Again, on the 15th of October, of the same year, the sun’s diameter, at nine o'clock A. M., was found equal to 61.50 revolutions of the same screw, used with the same telescope, when the sun’s semi-diameter is given 16' 4", or the diameter 32' 6"; but at the low altitude at which this measure was taken, the difference of the two refractions of the upper and lower limbs amounted, by the table of refractions, to 2' 6"; to be subtracted from the real to produce the apparent diameter, because the vertical diameter was contracted by this quantity, the lower limb being more elevated by refraction than the upper one; therefore, according to this observation, the value comes out $\frac{32' 7''}{61.5} = 31'.33$ for each revolution; hence the average of the two measures, taken at different times, and at different altitudes, is $\frac{31'.27 + 31'.33}{2} = 31'.3$, which determination accords with measures taken at other periods, and also with terrestrial measures subsequently taken, and will appear hereafter.

When this value of the micrometer’s revolutions was ascertained, the solar focus of the object-glasses was exactly measured, and found to be 63.5 inches. Three other achromatic telescopes were then procured, and had the same micrometer adapted to them respectively, by as many rings of brass, which had each a male and a female screw; the former to screw into the tube of its telescope, and the latter to receive the coarse thread of the micrometer; which rings we have called adapters. The focal lengths of the respective object-glasses were found by accurate measurement to be 30.15, 45.75, and 118.3 inches; and the corresponding
values of the micrometer’s revolution, found as above described, were 60°.0, 43°.5, and 10°.8; viz. exactly in the inverse proportion of their focal lengths, as the theory requires. Hence, when the value of the micrometer is known with a telescope of a known focal length, its value may be had, when applied to any other telescope of a determined focal length, by reciprocal proportion; for as 30.15 in. : 65.5 in. :: 31°.3 : 66°.0; and conversely, when the values are known, and the focal length of one of the telescopes, the focal lengths of all the others may be determined; which is

equally the case with the powers, depending solely on the focal lengths when the same eye-piece is used with each. When the values of the micrometer screw had been determined, both by measurement of the fun, and by mutual comparison of the focal lengths of the four achromatic telescopes, the two following tables were constructed to facilitate the use of the micrometer with any or all of the said telescopes, which we subjoin as a specimen by which other tables may be constructed by the simple arrangement of the multiples of the value of unity.

### Table I.—Values of entire Revolutions of the Micrometer’s Screw, with four different Teleopes.

<table>
<thead>
<tr>
<th>Revol.</th>
<th>30.15</th>
<th>45.75</th>
<th>63.5</th>
<th>118.3</th>
<th>Revol.</th>
<th>30.15</th>
<th>45.75</th>
<th>63.5</th>
<th>118.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>6</td>
<td>0</td>
<td>43.5</td>
<td>31</td>
<td>34</td>
<td>6</td>
<td>22</td>
<td>28.5</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>12</td>
<td>1</td>
<td>27.0</td>
<td>32</td>
<td>35</td>
<td>12</td>
<td>23</td>
<td>12.0</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>18</td>
<td>2</td>
<td>10.5</td>
<td>33</td>
<td>36</td>
<td>18</td>
<td>23</td>
<td>55.5</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>24</td>
<td>2</td>
<td>5.0</td>
<td>34</td>
<td>37</td>
<td>24</td>
<td>24</td>
<td>39.0</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>30</td>
<td>3</td>
<td>2.5</td>
<td>35</td>
<td>38</td>
<td>30</td>
<td>25</td>
<td>22.5</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>36</td>
<td>4</td>
<td>2.0</td>
<td>36</td>
<td>39</td>
<td>36</td>
<td>26</td>
<td>4.0</td>
</tr>
<tr>
<td>7</td>
<td>7</td>
<td>42</td>
<td>5</td>
<td>1.5</td>
<td>37</td>
<td>40</td>
<td>42</td>
<td>26</td>
<td>47.5</td>
</tr>
<tr>
<td>8</td>
<td>8</td>
<td>48</td>
<td>5</td>
<td>1.0</td>
<td>38</td>
<td>41</td>
<td>48</td>
<td>27</td>
<td>33.0</td>
</tr>
<tr>
<td>9</td>
<td>9</td>
<td>54</td>
<td>6</td>
<td>0.5</td>
<td>39</td>
<td>42</td>
<td>54</td>
<td>28</td>
<td>16.5</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>60</td>
<td>7</td>
<td>0.0</td>
<td>40</td>
<td>44</td>
<td>60</td>
<td>29</td>
<td>8.0</td>
</tr>
<tr>
<td>11</td>
<td>11</td>
<td>66</td>
<td>7</td>
<td>0.0</td>
<td>41</td>
<td>45</td>
<td>66</td>
<td>29</td>
<td>43.5</td>
</tr>
<tr>
<td>12</td>
<td>12</td>
<td>72</td>
<td>8</td>
<td>0.0</td>
<td>42</td>
<td>46</td>
<td>72</td>
<td>30</td>
<td>27.0</td>
</tr>
<tr>
<td>13</td>
<td>13</td>
<td>78</td>
<td>8</td>
<td>0.0</td>
<td>43</td>
<td>47</td>
<td>78</td>
<td>31</td>
<td>10.5</td>
</tr>
<tr>
<td>14</td>
<td>14</td>
<td>84</td>
<td>9</td>
<td>0.0</td>
<td>44</td>
<td>48</td>
<td>84</td>
<td>31</td>
<td>54.0</td>
</tr>
<tr>
<td>15</td>
<td>15</td>
<td>90</td>
<td>9</td>
<td>0.0</td>
<td>45</td>
<td>49</td>
<td>90</td>
<td>32</td>
<td>37.5</td>
</tr>
<tr>
<td>16</td>
<td>16</td>
<td>96</td>
<td>10</td>
<td>0.0</td>
<td>46</td>
<td>50</td>
<td>96</td>
<td>33</td>
<td>21.0</td>
</tr>
<tr>
<td>17</td>
<td>17</td>
<td>102</td>
<td>10</td>
<td>0.0</td>
<td>47</td>
<td>51</td>
<td>102</td>
<td>34</td>
<td>4.5</td>
</tr>
<tr>
<td>18</td>
<td>18</td>
<td>108</td>
<td>10</td>
<td>0.0</td>
<td>48</td>
<td>52</td>
<td>108</td>
<td>34</td>
<td>4.5</td>
</tr>
<tr>
<td>19</td>
<td>19</td>
<td>114</td>
<td>11</td>
<td>0.0</td>
<td>49</td>
<td>53</td>
<td>114</td>
<td>35</td>
<td>31.5</td>
</tr>
<tr>
<td>20</td>
<td>20</td>
<td>120</td>
<td>11</td>
<td>0.0</td>
<td>50</td>
<td>55</td>
<td>120</td>
<td>36</td>
<td>15.0</td>
</tr>
<tr>
<td>21</td>
<td>21</td>
<td>126</td>
<td>12</td>
<td>0.0</td>
<td>51</td>
<td>56</td>
<td>126</td>
<td>36</td>
<td>58.5</td>
</tr>
<tr>
<td>22</td>
<td>22</td>
<td>132</td>
<td>12</td>
<td>0.0</td>
<td>52</td>
<td>57</td>
<td>132</td>
<td>37</td>
<td>42.0</td>
</tr>
<tr>
<td>23</td>
<td>23</td>
<td>138</td>
<td>13</td>
<td>0.0</td>
<td>53</td>
<td>58</td>
<td>138</td>
<td>38</td>
<td>25.5</td>
</tr>
<tr>
<td>24</td>
<td>24</td>
<td>144</td>
<td>13</td>
<td>0.0</td>
<td>54</td>
<td>59</td>
<td>144</td>
<td>39</td>
<td>9.0</td>
</tr>
<tr>
<td>25</td>
<td>25</td>
<td>150</td>
<td>14</td>
<td>0.0</td>
<td>55</td>
<td>60</td>
<td>150</td>
<td>40</td>
<td>39.5</td>
</tr>
<tr>
<td>26</td>
<td>26</td>
<td>156</td>
<td>14</td>
<td>0.0</td>
<td>56</td>
<td>61</td>
<td>156</td>
<td>40</td>
<td>39.5</td>
</tr>
<tr>
<td>27</td>
<td>27</td>
<td>162</td>
<td>15</td>
<td>0.0</td>
<td>57</td>
<td>62</td>
<td>162</td>
<td>41</td>
<td>19.5</td>
</tr>
<tr>
<td>28</td>
<td>28</td>
<td>168</td>
<td>15</td>
<td>0.0</td>
<td>58</td>
<td>63</td>
<td>168</td>
<td>42</td>
<td>3.0</td>
</tr>
<tr>
<td>29</td>
<td>29</td>
<td>174</td>
<td>16</td>
<td>0.0</td>
<td>59</td>
<td>64</td>
<td>174</td>
<td>42</td>
<td>46.5</td>
</tr>
<tr>
<td>30</td>
<td>30</td>
<td>180</td>
<td>16</td>
<td>0.0</td>
<td>60</td>
<td>66</td>
<td>180</td>
<td>43</td>
<td>30.0</td>
</tr>
</tbody>
</table>

| 31     | 31    | 186   | 17   | 0.0   | 61     | 68    | 186   | 44   | 18.0  |
| 32     | 32    | 192   | 17   | 0.0   | 62     | 70    | 192   | 45   | 18.0  |
| 33     | 33    | 198   | 18   | 0.0   | 63     | 72    | 198   | 46   | 18.0  |
The use of these tables will be best understood from a few real examples.

1. The sun's diameter was taken by Troughton's micrometer, applied to the telescope of 45.75 inches focal length, on the 27th of May 1815, when its altitude was so high as to require no correction for the difference of the two fractions of the lower and upper limbs, and was found equal to 43.62 turns of the screw; then by Table I. 43 = 31° 10'.5, and by Table II. 62 = 26°.9, the sum of which is 31° 37'.4, the diameter given in the Nautical Almanac being 31° 37'. In this observation the thickness of the spider's line was allowed for.

2. On the 7th of August 1815, the sun's diameter at noon measured 60.60 turns, when the micrometer was used with the telescope of 63.5 inches focal length; whence we have 60 in Table I. = 31° 18', and .60 in Table II. = 18°.8, making together 31° 36'.8, the diameter in the Nautical Almanac for that day being 15° 48'.3 × 2 = 31° 36'.6. When these measures were taken, the telescope was on an equatorial stand, and the parallel lines were so placed, that the sun's body passed along the space contained between them, without any apparent variation of altitude, which position is necessary in every observation taken with Troughton's micrometer, when the object has an apparent motion.

3. On the 14th of August 1815, the moon's diameter was measured about 9 P.M. not far from the meridian, when her altitude was about 18°, with Troughton's micrometer, attached to the telescope of 45.75 inches focus, and was found equal to 41.52 turns of the screw; the horizontal semi-diameter, according to the Nautical Almanac, being at noon 15° 4', and at midnight 15° 6', consequently at the time 15° 1'. To the horizontal diameter 30° 2', add the augmentation at 18° altitude, (from Table I. of the requisite tables.) viz. 5', and the diameter in altitude will be 30° 7'. Now from Table I. take the value of 41 turns = 29° 43'.5, and from Table II. take the value of .52 = 22°.6; the sum of which two values will be 30° 7'.1, which must be increased by 5', the difference of refraction at 18°, and 18° 30' of altitude; so that the diameter, when the reductions are all made, is too great by 4' nearly, which error may be in the lunar tables, or in the observation, which was made when the moon's age was only eleven days, and therefore under an unfavourable circumstance;
TELESCOPE.

for n. this situation the illuminated portion of the moon is always apparently larger than the dark portion.

4. The fun's diameter was again taken at nine o'clock A.M. on the 15th of October, with the telescope of 63.5 inches, and was found equal to 61.56 turns, when the altitude was such as to require an addition of 2", for the variation of the refraction in half a degree of altitude; and here we have from Table I, 60 + 1 = 31'18" + 31"3 = 31'49"30, and from Table II. 56 = 7"15, making, together with 2", the correction, the fun 32"6", the diameter given in the Nautical Almanac being 16"4"8 x 2 = 32"6".

In all these examples, as well as in the data from which the preceding tables were compiled, Troughton's micrometer was used as a celestial eye-piece, where the object was consequently inverted, which is the manner in which this micrometer was intended to be used; but according to the construction of the modern terrestrial eye-tube, this micrometer may be substituted, by help of an adapter, for the two glasses at the eye-end of this tube, in which situation the magnifying power is very considerably increased, and consequently the scale rendered capable of measuring smaller portions of a second, than in the usual way, particularly when there is light enough in the field of view, i.e. when the object-glasses have a large diameter. When the micrometer in question is applied to the eye-end of the terrestrial tube of the telescope of 45.75 inches, one turn is equal to only 16"03, which shows the power to be somewhat greater than when the 118.8 inches telescope was used as a celestial telescope with the same micrometer; and with the telescope of 63.5 inches, which has three pairs of separate field-glasses, the terrestrial powers with the said micrometer gives the respective values of one turn of the screw 9"97, 7"98, and 5"15; so that this telescope has four various values of the micrometrical scale, which may be used in succession for measuring the same angle, according to circumstances, and each variety may have a separate table computed for its particular use. This application of Troughton's micrometer to the terrestrial tube, and the additional pairs of field-glasses, were contrived by the author of this article, and led to another addition, which in itself admits of still greater varieties. On observing that the modern terrestrial eye-tube is in fact a compound microscope, it occurred to him, that there are three modes of increasing the power of this instrument; first, by shortening the compound focus of the eye-glasses; secondly, by shortening the compound focus of the pair of field-glasses; and thirdly, by lengthening the distance between the compound eye-glasses and compound field-glasses (or object-glasses of the microscope). The two former modes had now been tried, and afforded the varieties in the measures which we have specified; the last one was therefore referred to thus: a tube was made to slide within the terrestrial tube, after its own eye-piece was withdrawn, and the micrometer was made to screw into this movable tube, so as to vary the distance of the micrometer glasses from the field-glasses of the telescope at pleasure. The result proved as was expected; every new position for distance gave a new value to the scale of the micrometer, and the two extremes of these values, with the 63.5 inch telescope, were 10" and 5" respectively per revolution of the screw; and at least the points were found by experiment on the sliding tube, where these values, and also the intermediate ones 6", 8", and 10" per revolution, were marked with a graver. The distances of these points depended on the field-glasses used with the sliding tube; and three sets of points were inferred, to correspond to the three pairs of field-glasses, any one of which admitted the scale to be subdivided into tenths of a second. This mode of applying a sliding micrometer in the terrestrial tube is as useful as novel; for when the position is made for an exact number of seconds per turn of the screw, the tables are dispensed with; the only operation being to multiply the number of turns by the number of seconds belonging to the position of the sliding tube, and then to reduce them to minutes by 100 as a divisor. A few examples will render these new methods of using the micrometer perfectly intelligible, and will at the same time show that they contribute greatly to accuracy, by a species of repetition of the measure, of which they are capable. We will first exemplify the method without the sliding tube.

1. The measures of Jupiter's diameter, taken by the 63.5 inch telescope on the 19th of April 1816, were as follows:

<table>
<thead>
<tr>
<th>Measure</th>
<th>Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>By Troughton's micrometer used</td>
<td>1.43 x 31.3 = 44.8</td>
</tr>
<tr>
<td>as a celestial eye-piece</td>
<td></td>
</tr>
<tr>
<td>By No 1. of the field-glasses with</td>
<td>4.23 x 9.97 = 42.2</td>
</tr>
<tr>
<td>the terrestrial tube</td>
<td></td>
</tr>
<tr>
<td>By No 2. of ditto</td>
<td>5.53 x 7.98 = 44.13</td>
</tr>
<tr>
<td>By No 3. of ditto</td>
<td>8.32 x 5.15 = 42.85</td>
</tr>
</tbody>
</table>

Average of the four measures = 43.495

The values of the three field-glasses had been taken by terrestrial measurement at 700 feet, on the 31st of March 1816, and may require further correction.

2. On the 30th of April 1816, Jupiter being very nearly in opposition, his diameter was measured with the 45.75 inch telescope, which has only two varieties, a celestial and a terrestrial application of the micrometer, and the result was thus: viz.

<table>
<thead>
<tr>
<th>Measure</th>
<th>Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>By the celestial measure, taken to the</td>
<td>1.04 turns</td>
</tr>
<tr>
<td>right of zero</td>
<td></td>
</tr>
<tr>
<td>By the same, taken to the left of zero</td>
<td>1.05 ditto</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2) 2.09</td>
</tr>
</tbody>
</table>

The terrestrial measure 2.72 x 16"03 = 43.50

The average of the celestial and terrestrial measures = 43.51

3. On the 25th of October 1815, the following measures were taken of the diameter of Mars with Troughton's micrometer attached to the sliding tube of the telescope 63.5 inches; viz.

<table>
<thead>
<tr>
<th>Measure</th>
<th>Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>First position at the dot of 7&quot;</td>
<td>3.43 x 7 = 24.01</td>
</tr>
<tr>
<td>with third field-glasses</td>
<td></td>
</tr>
<tr>
<td>Second position with ditto</td>
<td>2.96 x 8 = 23.68</td>
</tr>
<tr>
<td>Third position with ditto</td>
<td>2.68 x 9 = 24.12</td>
</tr>
<tr>
<td>Fourth position with ditto</td>
<td>2.40 x 10 = 24.00</td>
</tr>
<tr>
<td>With No 1. field-glass and its</td>
<td>6.0 x 4 = 24.00</td>
</tr>
<tr>
<td>dot 4&quot;</td>
<td></td>
</tr>
<tr>
<td>With No 2. field-glass and its</td>
<td>3.0 x 8 = 24.00</td>
</tr>
<tr>
<td>dot 8&quot;</td>
<td></td>
</tr>
<tr>
<td>With the micrometer used as a</td>
<td>0.77 x 31.3 = 24.10</td>
</tr>
<tr>
<td>celestial eye-piece</td>
<td></td>
</tr>
</tbody>
</table>

7) 167.91

23.087

These
These observations of Mars were made near the meridian, when he was a little past opposition, and consequently when his diameter was near a maximum, which circumstance we mention, because astronomers have given very discordant accounts of the apparent diameter of this planet; and perhaps no determination has been more accurate than we have here given.

The sun's diameter was measured at noon on the 24th of September 1816, by Troughton's micrometer adapted to the 30.15 inch telescope, in the following manner; viz.

By the cedial power 29.21 \times 65.7 = 1.91^{\circ}24
\text{By the terettrial, with the eye-}
tube slid to dot 30'
\text{By the terettrial, at dot 28''}
\text{By the terettrial, at dot 25''}

\text{Average measure}
\text{By the Nautical Almanac}

\begin{align*}
\text{29.21 	imes 65.7} &= 1.91^{\circ}24 \\
63.92 \times 30 &= 1.57 \ldots \\
68.50 \times 28 &= 1.58 \ldots \\
76.74 \times 25 &= 1.58 \ldots \\
\text{Average} &= 1.58 \ldots \\
\text{By the Nautical Almanac} &= 1.58 \ldots
\end{align*}

On the sliding tube of this telescope, the dots on the scale run from 31" to 19", at which dots the powers are to each other inversely as these numbers; but the whole diameter of the sun cannot be taken on the scale of the micrometer when a greater power is used, than when the position is at dot 25", or middle dot of the sliding tube, where the power is about 82.

In these four examples, the diameters measured were the vertical diameters, for making which Troughton's micrometer is peculiarly adapted; but the horizontal diameter of a body in motion cannot be taken with the same accuracy with this instrument, on account of the difficulty of keeping the extreme edges of the object in contact with the epider's lines, while the final adjustment of the measure is making.

For this purpose, Dollond's divided object-glass micrometer is more convenient, and may have its scale appreciated, and the values thereof tabulated in the way we have already explained. For instance, we obtained a divided object-glass, with the requisite adjustments both for circular motion and for the separation of the centre of the semi-lenses, of three inches and a half diameter, and fitted it over the object-end of the 45.75 inch achromatic of Talfy, while the original object-glass, of the same dimensions, remained in its place.

The focus of this divided object-glass was so long, that it shortened the original focus only to 40.3 inches. The scale of the object-glass is divided into inches and twentieth parts of an inch, one of which parts or subdivisions is again reduced by a vernier into twenty-five subordinates parts, so that \( \frac{1}{20} \) of \( \frac{1}{20} \) of \( \frac{1}{20} \) of an inch, is the smallest quantity appreciable by the vernier. On the 9th of August 1816, when the sun's diameter was 31'37", or 1897", the opposite limbs of the two apparent images of the sun coincided when the scale indicated three inches, one-twentieth part, and eleven towards 25 on the vernier, after an allowance was made for the index error by a crooked observation of a very small angle. Now these numbers reduced into the lowest denomination, give 1536 parts of the vernier, and

\[ \frac{1897}{1536} = 1.235 \text{ is the value of one of those parts; but by} \]
a terrestrial measurement, to be explained hereafter, the value taken at 700 feet distance, with a correction for want of parallelism of the rays at this distance, the value came out

\[ \frac{888}{713} = 1.245 \text{; the average of which two determina-} \]
tions, unconnected with each other, is 1".24 for each unit read on the vernier, and this determination was afterwards confirmed by an observation of the sun taken on the 25th September 1816, viz. 1".24 very nearly. After having given a value to Dollond's micrometer thus fitted up, on the 21st of August 1816, the diameter of Saturn's ring was measured when its longer diameter was very nearly horizontal, both to the right and left of zero, and was found equal to one subdivision and 7.7 on the vernier, or 25 + 7.7 = 32.7 parts of the vernier; then 32.7 \times 1".24 = 40.548 is the measure of the greatest length of Saturn's ring taken near the meridian, when the passage was at nearly 28 minutes past eleven P.M. ; and, consequently, when the planet was at no greater distance than eight days from opposition. On the 4th of August 1815, the greatest diameter of Saturn's ring however, measured with Troughton's micrometer attached to the 63.5 inch telescope, had been found by careful measurement = 1.50 \times 51.3 = 49.95, the planet being then only three days from opposition. By the same apparatus the ring had been made 49.4 on the 10th of September 1815, and on the 25th of the same month only 43''. These discrepancies showed that no dependence can be placed in horizontal measures made with Troughton's micrometer when the object is in apparent motion, but for all other measures of small angles, it is no doubt the belt that has been yet invented.

Dr. Brewster's micrometer has the same advantages as Dollond's, when the divided lens is used as the sliding lens within the tube; but the power of the patent telescopes hitherto constructed are so small, that an angle can seldom be measured with it nearer than to 10", and frequently not so near. The principle, however, is applicable to telescopes of larger dimensions.

When Dollond's and Troughton's micrometers are both applied to the telescope of 45.75 inches, the value of the scale of Troughton's becomes altered from 45.75 to 49.4, namely, in the inverse ratio of the diminished focus; and they may both be used with great convenience at the same time, in which case, one may measure the angular length and the other the angular breadth of the same body; or, if the body be celestial, one may give the horizontal and the other the vertical dimensions of the same instant. This mode of applying two micrometers, one optical and the other mechanical, at the same time, affords a mutual check on the measures of each, when the body is round, like one of the heavenly bodies, and gives a very satisfactory result, when it can be adopted. When Troughton's micrometer is used as a celestial eye-piece, along with Dollond's micrometer attached to the telescope 45.75, shortened to 40.3, the double images are formed beyond both eye-glasses, reckoning from the eye, and gives there 1".24 as the value of one stroke on the vernier; whereas when a common celestial eye-piece is used with Dollond's, the second glass of the compound piece shortens the focus of the object-glass a little, and the images are seen between the two glasses of the eye-piece; consequently the value of Dollond's micrometer varies a trifle with every different eye-piece, which is not the case with Troughton's, where the image is always in the unaltered focus of the object-glass.

On the 25th of September 1816, a careful series of observations was made of the sun's diameter with both Troughton's and Dollond's micrometers used at the same time, when the former gave 38.85 \times 49.4 = 51.59.2, and the other 15.47 (3 in. 1 div. 22 on vern.) \times 1".24 = 31'58.28, the diameter of the fun by the Nautical Almanac being...
TELESCOPE.

being 31° 59½' horizontally, and 31° 57½' vertically, at the altitude of 38°.

Terrestrial Measures.—In the examples which we have given of celestial angular measures taken by a micrometrical telescope, no correction of the measured angle was necessary, because the rays of light coming from these objects may be considered as parallel on entering the object-glasses, and as always converging to the same focal point, where the image is formed; hence the magnifying power of the celestial telescope does not vary. But when terrestrial objects are viewed at different distances, there is a deviation from parallelism in the course of the rays, which increases in the inverse ratio of the distance, and which lengthens the focus of the object-glasses, and consequently increases the power of the instrument, even with the same glasses. This alteration in the effective length of a telescope is practically discovered by the adjustment of the eye-piece for distinct vision, which is necessarily different at different distances from the object viewed. But we have shown, that the scales of Troughton's and of Dollond's micrometers will vary with the variable powers of even the same telescope, and therefore will require a correction for each variety of power, or, in other words, for each variety of terrestrial distance. The determination of these varying corrections, therefore, is essential to the accuracy of the measures taken by a micrometer in all cases, where the incident rays of light come diverging from objects placed at moderate distances. If we put \( f \) for the solar or principal focus of the object-glasses of any telescope, and \( d \) for the distance of an object from the said object-glasses when used, the addition to the length of the solar focus, which we will call \( \epsilon \), according to the laws of dioptrics, may be found by this theorem, \( \frac{f^2}{d-f} = \epsilon \); that is, the square of the solar focus, divided by the distance in the same measure, when diminished by one focal distance, will be the elongation, or excess of the lengthened focus over the solar focus; then as the powers are to each other respectively as the focal lengths, with the same eye-piece, we shall have \( f : f + \epsilon : \) true angle : measured or apparent angle; and conversely, as \( f + \epsilon : f : \) apparent angle : true angle. For instance, let it be required to ascertain what is the necessary correction for an angle, measured by a telescope of 63.5 inches focus, that is subtended by one yard at a hundred yards distance from the object-glasses. By a simple case in plain trigonometry, the true angle subtended by a yard, at a hundred yards distance, is 34° 59'' 4, or 34° 19.99; and 63.5 inches are 1.764, when reduced into the denomination of yards and decimal parts; then 

\[
\frac{1.764 \times 1.764}{100} = 3.111696 = 0.03167 = \epsilon,
\]

the increased length of the focus; and 

\[
1.764 + 0.03167 \times 34.99 = 1.704
\]

35° 61½', or 35° 37½.08 will be the measured angle, therefore 

\[
35° 37½.08 - 34° 59'' 4 = 37.68
\]

is the correction to be added to the true angle, in order to obtain the apparent angle, that would have been the true angle also, if the focus of the object-glasses had remained unaltered at the distance of 100 yards. But it is the correction answering to the apparent or measured angle that we want, and the determination of this requires a transposition which is operose, and therefore objectionable in practice; on which account we recommend each surveyor, military tactician, and leveller, who is disposed to avail himself of the use of a micrometrical telescope, for shortening his labours, to use tables adapted to the focal length of his own telescope, which may give by inspection the correction proper in all cases for reducing the apparent angle into the true one, and vice versa. Tables III. and IV. which are subjoined, were computed for this purpose, from the theorem just exemplified, and are adapted for a telescope of 63.5 inches focal length, to which we have added Table V., as a general table for finding the distance, in yards and decimal parts, corresponding to any angle, from \( 1° \) to \( 30° \) 59½'' inclusively; even to the accuracy of a single second, when that angle is subtended by an exact yard. The labour of constructing these tables has been considerable, but the facility and accuracy with which they give the desired results, has amply repaid the computer, and, it is presumed, will be a recommendation to the notice of our scientific readers, to whom their application may in many cases be found useful.
TELESCOPE.
Tablk

True

III.

—

For converting the true
apparent Angle.

into the

Table IV.

— For converting the apparent
true Angle.

into

the


### Table V. — For finding the Distance in Yards from the True Angle subtended by one Yard.

<table>
<thead>
<tr>
<th>True Angle</th>
<th>0&quot;</th>
<th>1&quot;</th>
<th>2&quot;</th>
<th>3&quot;</th>
<th>4&quot;</th>
<th>5&quot;</th>
<th>6&quot;</th>
<th>7&quot;</th>
<th>8&quot;</th>
<th>9&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&quot;</td>
<td>3437.7</td>
<td>3381.34</td>
<td>3326.8</td>
<td>3274.8</td>
<td>3222.8</td>
<td>3173.26</td>
<td>3125.15</td>
<td>3078.54</td>
<td>3032.25</td>
<td>2989.3</td>
</tr>
<tr>
<td>2&quot;</td>
<td>1718.85</td>
<td>1704.64</td>
<td>1690.67</td>
<td>1676.93</td>
<td>1663.4</td>
<td>1650.1</td>
<td>1637.3</td>
<td>1624.11</td>
<td>1611.4</td>
<td>1598.93</td>
</tr>
<tr>
<td>3&quot;</td>
<td>1145.9</td>
<td>1139.56</td>
<td>1133.3</td>
<td>1127.11</td>
<td>1120.98</td>
<td>1114.92</td>
<td>1108.94</td>
<td>1103.9</td>
<td>1097.15</td>
<td>1091.33</td>
</tr>
<tr>
<td>4&quot;</td>
<td>859.43</td>
<td>855.83</td>
<td>852.32</td>
<td>848.81</td>
<td>845.33</td>
<td>841.88</td>
<td>838.46</td>
<td>835.06</td>
<td>831.7</td>
<td>828.36</td>
</tr>
<tr>
<td>5&quot;</td>
<td>687.54</td>
<td>685.25</td>
<td>682.98</td>
<td>680.73</td>
<td>678.45</td>
<td>676.27</td>
<td>674.05</td>
<td>671.86</td>
<td>669.63</td>
<td>667.51</td>
</tr>
<tr>
<td>6&quot;</td>
<td>572.95</td>
<td>571.36</td>
<td>569.78</td>
<td>568.21</td>
<td>566.65</td>
<td>565.10</td>
<td>563.55</td>
<td>562.02</td>
<td>560.49</td>
<td>558.98</td>
</tr>
<tr>
<td>7&quot;</td>
<td>491.1</td>
<td>489.93</td>
<td>488.77</td>
<td>487.62</td>
<td>486.46</td>
<td>485.32</td>
<td>484.18</td>
<td>483.05</td>
<td>481.92</td>
<td>480.80</td>
</tr>
<tr>
<td>8&quot;</td>
<td>429.71</td>
<td>428.81</td>
<td>427.91</td>
<td>427.03</td>
<td>426.16</td>
<td>425.28</td>
<td>424.40</td>
<td>423.53</td>
<td>422.66</td>
<td>421.80</td>
</tr>
<tr>
<td>9&quot;</td>
<td>381.96</td>
<td>381.25</td>
<td>380.55</td>
<td>379.85</td>
<td>379.15</td>
<td>378.46</td>
<td>377.77</td>
<td>377.07</td>
<td>376.39</td>
<td>375.70</td>
</tr>
<tr>
<td>10&quot;</td>
<td>343.77</td>
<td>343.19</td>
<td>342.62</td>
<td>342.05</td>
<td>341.49</td>
<td>340.93</td>
<td>340.36</td>
<td>339.79</td>
<td>339.23</td>
<td>338.69</td>
</tr>
<tr>
<td>11&quot;</td>
<td>312.52</td>
<td>312.02</td>
<td>311.52</td>
<td>311.09</td>
<td>310.63</td>
<td>310.17</td>
<td>309.70</td>
<td>309.23</td>
<td>308.77</td>
<td>308.31</td>
</tr>
<tr>
<td>12&quot;</td>
<td>286.47</td>
<td>286.07</td>
<td>285.68</td>
<td>285.28</td>
<td>284.89</td>
<td>284.49</td>
<td>284.10</td>
<td>283.71</td>
<td>283.32</td>
<td>282.93</td>
</tr>
<tr>
<td>13&quot;</td>
<td>264.44</td>
<td>264.10</td>
<td>263.76</td>
<td>263.42</td>
<td>263.09</td>
<td>262.76</td>
<td>262.42</td>
<td>262.08</td>
<td>261.75</td>
<td>261.42</td>
</tr>
<tr>
<td>14&quot;</td>
<td>245.55</td>
<td>245.26</td>
<td>244.97</td>
<td>244.67</td>
<td>244.38</td>
<td>244.09</td>
<td>243.81</td>
<td>243.52</td>
<td>243.23</td>
<td>242.94</td>
</tr>
<tr>
<td>15&quot;</td>
<td>229.18</td>
<td>228.92</td>
<td>228.67</td>
<td>228.41</td>
<td>228.16</td>
<td>227.91</td>
<td>227.66</td>
<td>227.41</td>
<td>227.16</td>
<td>226.91</td>
</tr>
<tr>
<td>16&quot;</td>
<td>214.85</td>
<td>214.62</td>
<td>214.40</td>
<td>214.17</td>
<td>213.95</td>
<td>213.72</td>
<td>213.51</td>
<td>213.29</td>
<td>213.08</td>
<td>212.86</td>
</tr>
<tr>
<td>17&quot;</td>
<td>202.22</td>
<td>202.02</td>
<td>201.82</td>
<td>201.62</td>
<td>201.42</td>
<td>201.22</td>
<td>201.03</td>
<td>200.83</td>
<td>200.64</td>
<td>200.44</td>
</tr>
<tr>
<td>18&quot;</td>
<td>190.98</td>
<td>190.80</td>
<td>190.62</td>
<td>190.35</td>
<td>190.27</td>
<td>190.09</td>
<td>189.92</td>
<td>189.74</td>
<td>189.57</td>
<td>189.40</td>
</tr>
<tr>
<td>19&quot;</td>
<td>180.03</td>
<td>180.77</td>
<td>180.61</td>
<td>180.45</td>
<td>180.29</td>
<td>180.13</td>
<td>179.98</td>
<td>179.82</td>
<td>179.67</td>
<td>179.51</td>
</tr>
<tr>
<td>20&quot;</td>
<td>171.88</td>
<td>171.73</td>
<td>171.59</td>
<td>171.44</td>
<td>171.31</td>
<td>171.17</td>
<td>171.02</td>
<td>170.88</td>
<td>170.74</td>
<td>170.60</td>
</tr>
<tr>
<td>21&quot;</td>
<td>163.70</td>
<td>163.57</td>
<td>163.44</td>
<td>163.31</td>
<td>163.18</td>
<td>163.05</td>
<td>162.92</td>
<td>162.79</td>
<td>162.66</td>
<td>162.53</td>
</tr>
<tr>
<td>22&quot;</td>
<td>156.26</td>
<td>156.13</td>
<td>156.01</td>
<td>155.88</td>
<td>155.76</td>
<td>155.64</td>
<td>155.54</td>
<td>155.42</td>
<td>155.31</td>
<td>155.19</td>
</tr>
<tr>
<td>23&quot;</td>
<td>149.46</td>
<td>149.35</td>
<td>149.24</td>
<td>149.13</td>
<td>149.03</td>
<td>148.93</td>
<td>148.82</td>
<td>148.71</td>
<td>148.60</td>
<td>148.49</td>
</tr>
<tr>
<td>24&quot;</td>
<td>143.23</td>
<td>143.13</td>
<td>143.03</td>
<td>142.94</td>
<td>142.84</td>
<td>142.75</td>
<td>142.64</td>
<td>142.54</td>
<td>142.44</td>
<td>142.34</td>
</tr>
<tr>
<td>25&quot;</td>
<td>137.51</td>
<td>137.41</td>
<td>137.32</td>
<td>137.23</td>
<td>137.14</td>
<td>137.05</td>
<td>136.96</td>
<td>136.87</td>
<td>136.78</td>
<td>136.68</td>
</tr>
<tr>
<td>26&quot;</td>
<td>132.22</td>
<td>132.13</td>
<td>132.05</td>
<td>131.96</td>
<td>131.88</td>
<td>131.80</td>
<td>131.71</td>
<td>131.62</td>
<td>131.54</td>
<td>131.46</td>
</tr>
<tr>
<td>27&quot;</td>
<td>127.32</td>
<td>127.24</td>
<td>127.16</td>
<td>127.08</td>
<td>127.00</td>
<td>126.93</td>
<td>126.85</td>
<td>126.77</td>
<td>126.69</td>
<td>126.61</td>
</tr>
<tr>
<td>28&quot;</td>
<td>122.78</td>
<td>122.70</td>
<td>122.63</td>
<td>122.55</td>
<td>122.48</td>
<td>122.41</td>
<td>122.33</td>
<td>122.26</td>
<td>122.19</td>
<td>122.11</td>
</tr>
<tr>
<td>29&quot;</td>
<td>118.54</td>
<td>118.47</td>
<td>118.40</td>
<td>118.33</td>
<td>118.26</td>
<td>118.19</td>
<td>118.13</td>
<td>118.07</td>
<td>118.00</td>
<td>117.93</td>
</tr>
<tr>
<td>30&quot;</td>
<td>114.59</td>
<td>114.52</td>
<td>114.46</td>
<td>114.40</td>
<td>114.33</td>
<td>114.27</td>
<td>114.20</td>
<td>114.14</td>
<td>114.08</td>
<td>114.01</td>
</tr>
</tbody>
</table>
### Table V—continued.

<table>
<thead>
<tr>
<th>Angular</th>
<th>10&quot;</th>
<th>11&quot;</th>
<th>12&quot;</th>
<th>13&quot;</th>
<th>14&quot;</th>
<th>15&quot;</th>
<th>16&quot;</th>
<th>17&quot;</th>
<th>18&quot;</th>
<th>19&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>1°</td>
<td>2946.6</td>
<td>2905.1</td>
<td>1867.75</td>
<td>2825.5</td>
<td>2787.25</td>
<td>2750.16</td>
<td>2713.97</td>
<td>2678.73</td>
<td>2644.38</td>
<td>2610.91</td>
</tr>
<tr>
<td>2°</td>
<td>1586.63</td>
<td>1574.52</td>
<td>1567.57</td>
<td>1550.84</td>
<td>1539.27</td>
<td>1527.86</td>
<td>1516.62</td>
<td>1505.56</td>
<td>1494.65</td>
<td>1483.9</td>
</tr>
<tr>
<td>3°</td>
<td>1085.6</td>
<td>1079.9</td>
<td>1054.27</td>
<td>1068.71</td>
<td>1063.25</td>
<td>1057.75</td>
<td>1052.35</td>
<td>1047.01</td>
<td>1041.74</td>
<td>1036.49</td>
</tr>
<tr>
<td>4°</td>
<td>825.05</td>
<td>821.76</td>
<td>818.5</td>
<td>815.22</td>
<td>812.05</td>
<td>808.86</td>
<td>805.7</td>
<td>802.57</td>
<td>799.46</td>
<td>796.37</td>
</tr>
<tr>
<td>5°</td>
<td>665.56</td>
<td>663.22</td>
<td>661.09</td>
<td>658.98</td>
<td>656.88</td>
<td>654.8</td>
<td>652.73</td>
<td>650.67</td>
<td>648.62</td>
<td>646.58</td>
</tr>
<tr>
<td>6°</td>
<td>557.46</td>
<td>555.96</td>
<td>554.47</td>
<td>552.98</td>
<td>551.5</td>
<td>550.03</td>
<td>548.58</td>
<td>547.12</td>
<td>545.66</td>
<td>544.23</td>
</tr>
<tr>
<td>7°</td>
<td>479.68</td>
<td>478.59</td>
<td>477.66</td>
<td>476.36</td>
<td>475.26</td>
<td>474.16</td>
<td>473.08</td>
<td>472.0</td>
<td>470.92</td>
<td>469.84</td>
</tr>
<tr>
<td>8°</td>
<td>420.94</td>
<td>420.08</td>
<td>419.23</td>
<td>418.38</td>
<td>417.53</td>
<td>416.69</td>
<td>415.85</td>
<td>415.01</td>
<td>414.18</td>
<td>413.35</td>
</tr>
<tr>
<td>9°</td>
<td>375.02</td>
<td>374.34</td>
<td>373.66</td>
<td>372.98</td>
<td>372.31</td>
<td>371.64</td>
<td>370.97</td>
<td>370.31</td>
<td>369.65</td>
<td>368.98</td>
</tr>
<tr>
<td>10°</td>
<td>338.13</td>
<td>337.57</td>
<td>337.62</td>
<td>336.47</td>
<td>335.93</td>
<td>335.38</td>
<td>334.82</td>
<td>334.29</td>
<td>333.76</td>
<td>333.22</td>
</tr>
<tr>
<td>11°</td>
<td>307.85</td>
<td>307.39</td>
<td>306.93</td>
<td>306.47</td>
<td>306.02</td>
<td>305.57</td>
<td>305.12</td>
<td>304.67</td>
<td>304.22</td>
<td>303.77</td>
</tr>
<tr>
<td>12°</td>
<td>282.55</td>
<td>282.16</td>
<td>281.77</td>
<td>281.39</td>
<td>281.01</td>
<td>280.63</td>
<td>280.24</td>
<td>279.86</td>
<td>279.49</td>
<td>279.11</td>
</tr>
<tr>
<td>13°</td>
<td>261.09</td>
<td>260.76</td>
<td>260.13</td>
<td>259.78</td>
<td>259.45</td>
<td>259.12</td>
<td>258.8</td>
<td>258.47</td>
<td>258.15</td>
<td>257.82</td>
</tr>
<tr>
<td>14°</td>
<td>242.66</td>
<td>242.37</td>
<td>242.09</td>
<td>241.8</td>
<td>241.52</td>
<td>241.24</td>
<td>240.96</td>
<td>240.68</td>
<td>240.4</td>
<td>240.12</td>
</tr>
<tr>
<td>15°</td>
<td>226.66</td>
<td>226.41</td>
<td>226.6</td>
<td>225.91</td>
<td>225.67</td>
<td>225.42</td>
<td>225.18</td>
<td>224.93</td>
<td>224.69</td>
<td>224.44</td>
</tr>
<tr>
<td>16°</td>
<td>212.64</td>
<td>212.42</td>
<td>212.2</td>
<td>211.98</td>
<td>211.76</td>
<td>211.54</td>
<td>211.33</td>
<td>211.11</td>
<td>210.9</td>
<td>210.68</td>
</tr>
<tr>
<td>17°</td>
<td>200.25</td>
<td>200.05</td>
<td>199.86</td>
<td>199.66</td>
<td>199.47</td>
<td>199.28</td>
<td>199.09</td>
<td>198.9</td>
<td>198.71</td>
<td>198.52</td>
</tr>
<tr>
<td>18°</td>
<td>189.23</td>
<td>189.05</td>
<td>188.88</td>
<td>188.7</td>
<td>188.53</td>
<td>188.36</td>
<td>188.19</td>
<td>188.02</td>
<td>187.85</td>
<td>187.68</td>
</tr>
<tr>
<td>19°</td>
<td>179.35</td>
<td>179.19</td>
<td>179.04</td>
<td>178.88</td>
<td>178.73</td>
<td>178.57</td>
<td>178.42</td>
<td>178.26</td>
<td>178.11</td>
<td>177.96</td>
</tr>
<tr>
<td>20°</td>
<td>170.46</td>
<td>170.32</td>
<td>170.8</td>
<td>170.4</td>
<td>169.9</td>
<td>169.65</td>
<td>169.62</td>
<td>169.48</td>
<td>169.34</td>
<td>169.2</td>
</tr>
<tr>
<td>21°</td>
<td>162.41</td>
<td>162.28</td>
<td>162.16</td>
<td>162.03</td>
<td>161.91</td>
<td>161.77</td>
<td>161.65</td>
<td>161.51</td>
<td>161.39</td>
<td>161.26</td>
</tr>
<tr>
<td>22°</td>
<td>155.08</td>
<td>154.86</td>
<td>154.73</td>
<td>154.62</td>
<td>154.59</td>
<td>154.5</td>
<td>154.47</td>
<td>154.45</td>
<td>154.03</td>
<td>154.03</td>
</tr>
<tr>
<td>23°</td>
<td>148.38</td>
<td>148.27</td>
<td>148.17</td>
<td>148.06</td>
<td>147.96</td>
<td>147.85</td>
<td>147.75</td>
<td>147.64</td>
<td>147.54</td>
<td>147.43</td>
</tr>
<tr>
<td>24°</td>
<td>142.24</td>
<td>142.14</td>
<td>142.05</td>
<td>141.95</td>
<td>141.85</td>
<td>141.75</td>
<td>141.66</td>
<td>141.56</td>
<td>141.46</td>
<td>141.36</td>
</tr>
<tr>
<td>25°</td>
<td>136.59</td>
<td>136.5</td>
<td>136.41</td>
<td>136.32</td>
<td>136.23</td>
<td>136.14</td>
<td>136.05</td>
<td>135.96</td>
<td>135.87</td>
<td>135.79</td>
</tr>
<tr>
<td>26°</td>
<td>131.38</td>
<td>131.29</td>
<td>131.21</td>
<td>131.12</td>
<td>131.04</td>
<td>130.95</td>
<td>130.87</td>
<td>130.79</td>
<td>130.71</td>
<td>130.62</td>
</tr>
<tr>
<td>27°</td>
<td>126.54</td>
<td>126.45</td>
<td>126.38</td>
<td>126.3</td>
<td>126.23</td>
<td>126.14</td>
<td>126.07</td>
<td>125.99</td>
<td>125.92</td>
<td>125.84</td>
</tr>
<tr>
<td>28°</td>
<td>122.04</td>
<td>121.97</td>
<td>121.9</td>
<td>121.83</td>
<td>121.76</td>
<td>121.69</td>
<td>121.62</td>
<td>121.54</td>
<td>121.47</td>
<td>121.4</td>
</tr>
<tr>
<td>29°</td>
<td>117.86</td>
<td>117.79</td>
<td>117.73</td>
<td>117.66</td>
<td>117.59</td>
<td>117.52</td>
<td>117.46</td>
<td>117.39</td>
<td>117.32</td>
<td>117.26</td>
</tr>
<tr>
<td>30°</td>
<td>113.95</td>
<td>113.89</td>
<td>113.83</td>
<td>113.76</td>
<td>113.7</td>
<td>113.64</td>
<td>113.58</td>
<td>113.51</td>
<td>113.45</td>
<td>113.39</td>
</tr>
</tbody>
</table>
### Table V.—continued.

<table>
<thead>
<tr>
<th>True Angle</th>
<th>20&quot;</th>
<th>21&quot;</th>
<th>22&quot;</th>
<th>23&quot;</th>
<th>24&quot;</th>
<th>25&quot;</th>
<th>26&quot;</th>
<th>27&quot;</th>
<th>28&quot;</th>
<th>29&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>1'</td>
<td>2578.27</td>
<td>2546.44</td>
<td>2515.4</td>
<td>2485.1</td>
<td>2455.5</td>
<td>2426.6</td>
<td>2398.4</td>
<td>2370.82</td>
<td>2343.87</td>
<td>2317.55</td>
</tr>
<tr>
<td>2</td>
<td>1473.31</td>
<td>1462.86</td>
<td>1452.55</td>
<td>1442.38</td>
<td>1432.37</td>
<td>1422.49</td>
<td>1412.75</td>
<td>1403.14</td>
<td>1393.62</td>
<td>1384.31</td>
</tr>
<tr>
<td>3</td>
<td>1031.31</td>
<td>1026.17</td>
<td>1021.1</td>
<td>1016.07</td>
<td>1011.05</td>
<td>1006.16</td>
<td>1001.27</td>
<td>996.43</td>
<td>991.64</td>
<td>986.9</td>
</tr>
<tr>
<td>4</td>
<td>793.32</td>
<td>790.24</td>
<td>787.26</td>
<td>784.26</td>
<td>781.28</td>
<td>778.34</td>
<td>775.42</td>
<td>772.51</td>
<td>769.64</td>
<td>766.78</td>
</tr>
<tr>
<td>5</td>
<td>644.56</td>
<td>642.56</td>
<td>640.56</td>
<td>638.58</td>
<td>636.61</td>
<td>634.65</td>
<td>632.70</td>
<td>630.77</td>
<td>628.85</td>
<td>626.94</td>
</tr>
<tr>
<td>6</td>
<td>544.8</td>
<td>541.37</td>
<td>539.95</td>
<td>538.56</td>
<td>537.18</td>
<td>535.75</td>
<td>534.36</td>
<td>532.99</td>
<td>531.62</td>
<td>530.25</td>
</tr>
<tr>
<td>7</td>
<td>468.77</td>
<td>467.70</td>
<td>466.63</td>
<td>465.59</td>
<td>464.55</td>
<td>463.51</td>
<td>462.47</td>
<td>461.46</td>
<td>460.45</td>
<td>459.41</td>
</tr>
<tr>
<td>8</td>
<td>412.53</td>
<td>411.70</td>
<td>410.88</td>
<td>410.06</td>
<td>409.25</td>
<td>408.42</td>
<td>407.61</td>
<td>406.81</td>
<td>406.03</td>
<td>405.22</td>
</tr>
<tr>
<td>9</td>
<td>368.33</td>
<td>367.66</td>
<td>367.02</td>
<td>366.36</td>
<td>365.71</td>
<td>365.06</td>
<td>364.42</td>
<td>363.78</td>
<td>363.14</td>
<td>362.49</td>
</tr>
<tr>
<td>10</td>
<td>332.08</td>
<td>331.4</td>
<td>330.8</td>
<td>330.2</td>
<td>330.02</td>
<td>329.49</td>
<td>329.06</td>
<td>328.67</td>
<td>328.44</td>
<td>327.92</td>
</tr>
<tr>
<td>11</td>
<td>303.32</td>
<td>302.87</td>
<td>302.43</td>
<td>301.99</td>
<td>301.55</td>
<td>301.11</td>
<td>300.67</td>
<td>300.23</td>
<td>299.80</td>
<td>299.36</td>
</tr>
<tr>
<td>12</td>
<td>278.73</td>
<td>278.35</td>
<td>277.98</td>
<td>277.6</td>
<td>277.23</td>
<td>276.86</td>
<td>276.49</td>
<td>276.12</td>
<td>275.75</td>
<td>275.38</td>
</tr>
<tr>
<td>13</td>
<td>257.82</td>
<td>257.49</td>
<td>257.16</td>
<td>256.83</td>
<td>256.51</td>
<td>256.20</td>
<td>255.90</td>
<td>255.58</td>
<td>255.27</td>
<td>254.96</td>
</tr>
<tr>
<td>14</td>
<td>239.84</td>
<td>239.56</td>
<td>239.29</td>
<td>239.01</td>
<td>238.73</td>
<td>238.45</td>
<td>238.18</td>
<td>237.90</td>
<td>237.63</td>
<td>237.35</td>
</tr>
<tr>
<td>15</td>
<td>224.20</td>
<td>223.95</td>
<td>223.71</td>
<td>223.46</td>
<td>223.22</td>
<td>222.98</td>
<td>222.74</td>
<td>222.50</td>
<td>222.26</td>
<td>222.02</td>
</tr>
<tr>
<td>16</td>
<td>210.47</td>
<td>210.25</td>
<td>210.04</td>
<td>209.82</td>
<td>209.61</td>
<td>209.40</td>
<td>209.19</td>
<td>208.97</td>
<td>208.76</td>
<td>208.55</td>
</tr>
<tr>
<td>17</td>
<td>198.33</td>
<td>198.13</td>
<td>197.94</td>
<td>197.75</td>
<td>197.56</td>
<td>197.37</td>
<td>197.18</td>
<td>197.09</td>
<td>196.81</td>
<td>196.72</td>
</tr>
<tr>
<td>18</td>
<td>187.51</td>
<td>187.34</td>
<td>187.17</td>
<td>187.00</td>
<td>186.83</td>
<td>186.66</td>
<td>186.49</td>
<td>186.32</td>
<td>186.15</td>
<td>185.98</td>
</tr>
<tr>
<td>19</td>
<td>177.81</td>
<td>177.65</td>
<td>177.50</td>
<td>177.35</td>
<td>177.20</td>
<td>177.04</td>
<td>176.89</td>
<td>176.74</td>
<td>176.59</td>
<td>176.44</td>
</tr>
<tr>
<td>20</td>
<td>169.06</td>
<td>168.92</td>
<td>168.78</td>
<td>168.64</td>
<td>168.51</td>
<td>168.37</td>
<td>168.24</td>
<td>168.10</td>
<td>167.97</td>
<td>167.82</td>
</tr>
<tr>
<td>21</td>
<td>161.14</td>
<td>161.01</td>
<td>160.89</td>
<td>160.76</td>
<td>160.64</td>
<td>160.51</td>
<td>160.39</td>
<td>160.26</td>
<td>160.14</td>
<td>160.01</td>
</tr>
<tr>
<td>22</td>
<td>153.92</td>
<td>153.80</td>
<td>153.69</td>
<td>153.57</td>
<td>153.46</td>
<td>153.34</td>
<td>153.23</td>
<td>153.12</td>
<td>153.01</td>
<td>152.89</td>
</tr>
<tr>
<td>23</td>
<td>147.33</td>
<td>147.22</td>
<td>147.12</td>
<td>147.01</td>
<td>146.91</td>
<td>146.80</td>
<td>146.70</td>
<td>146.59</td>
<td>146.49</td>
<td>146.38</td>
</tr>
<tr>
<td>24</td>
<td>141.27</td>
<td>141.17</td>
<td>141.08</td>
<td>140.98</td>
<td>140.88</td>
<td>140.78</td>
<td>140.69</td>
<td>140.59</td>
<td>140.50</td>
<td>140.40</td>
</tr>
<tr>
<td>25</td>
<td>135.76</td>
<td>135.61</td>
<td>135.52</td>
<td>135.43</td>
<td>135.34</td>
<td>135.25</td>
<td>135.16</td>
<td>135.07</td>
<td>134.98</td>
<td>134.89</td>
</tr>
<tr>
<td>26</td>
<td>130.54</td>
<td>130.46</td>
<td>130.38</td>
<td>130.29</td>
<td>130.21</td>
<td>130.13</td>
<td>130.05</td>
<td>129.97</td>
<td>129.89</td>
<td>129.80</td>
</tr>
<tr>
<td>27</td>
<td>125.77</td>
<td>125.69</td>
<td>125.62</td>
<td>125.54</td>
<td>125.47</td>
<td>125.38</td>
<td>125.31</td>
<td>125.23</td>
<td>125.16</td>
<td>125.08</td>
</tr>
<tr>
<td>28</td>
<td>121.33</td>
<td>121.25</td>
<td>121.18</td>
<td>121.11</td>
<td>121.04</td>
<td>120.97</td>
<td>120.90</td>
<td>120.83</td>
<td>120.76</td>
<td>120.69</td>
</tr>
<tr>
<td>29</td>
<td>117.19</td>
<td>117.12</td>
<td>117.05</td>
<td>116.98</td>
<td>116.92</td>
<td>116.85</td>
<td>116.78</td>
<td>116.71</td>
<td>116.65</td>
<td>116.58</td>
</tr>
<tr>
<td>30</td>
<td>113.33</td>
<td>113.26</td>
<td>113.20</td>
<td>113.14</td>
<td>113.08</td>
<td>113.01</td>
<td>112.95</td>
<td>112.89</td>
<td>112.83</td>
<td>112.77</td>
</tr>
</tbody>
</table>
### Telecope.

Table V.—continued.

<table>
<thead>
<tr>
<th>True Angle</th>
<th>30''</th>
<th>31''</th>
<th>32''</th>
<th>33''</th>
<th>34''</th>
<th>35''</th>
<th>36''</th>
<th>37''</th>
<th>38''</th>
<th>39''</th>
</tr>
</thead>
<tbody>
<tr>
<td>1'</td>
<td>2291.8</td>
<td>2266.61</td>
<td>2241.97</td>
<td>2217.87</td>
<td>2194.3</td>
<td>2171.2</td>
<td>2148.55</td>
<td>2126.41</td>
<td>2104.7</td>
<td>2083.47</td>
</tr>
<tr>
<td>2</td>
<td>1375.08</td>
<td>1365.97</td>
<td>1356.93</td>
<td>1348.1</td>
<td>1339.36</td>
<td>1330.72</td>
<td>1322.19</td>
<td>1313.77</td>
<td>1305.45</td>
<td>1297.23</td>
</tr>
<tr>
<td>3</td>
<td>982.2</td>
<td>977.54</td>
<td>972.93</td>
<td>968.36</td>
<td>963.84</td>
<td>959.36</td>
<td>954.91</td>
<td>950.51</td>
<td>946.15</td>
<td>941.83</td>
</tr>
<tr>
<td>4</td>
<td>763.93</td>
<td>761.11</td>
<td>758.31</td>
<td>755.54</td>
<td>752.78</td>
<td>750.04</td>
<td>747.33</td>
<td>744.62</td>
<td>741.95</td>
<td>739.29</td>
</tr>
<tr>
<td>5</td>
<td>625.03</td>
<td>623.15</td>
<td>621.23</td>
<td>619.40</td>
<td>617.55</td>
<td>615.71</td>
<td>613.87</td>
<td>612.05</td>
<td>610.24</td>
<td>608.44</td>
</tr>
<tr>
<td>6</td>
<td>528.88</td>
<td>527.53</td>
<td>526.18</td>
<td>524.84</td>
<td>523.50</td>
<td>522.18</td>
<td>520.87</td>
<td>519.55</td>
<td>518.24</td>
<td>516.95</td>
</tr>
<tr>
<td>7</td>
<td>458.36</td>
<td>457.34</td>
<td>456.33</td>
<td>455.33</td>
<td>454.32</td>
<td>453.32</td>
<td>452.33</td>
<td>451.34</td>
<td>450.36</td>
<td>449.37</td>
</tr>
<tr>
<td>8</td>
<td>404.43</td>
<td>403.64</td>
<td>402.85</td>
<td>402.06</td>
<td>401.29</td>
<td>400.51</td>
<td>399.73</td>
<td>398.95</td>
<td>398.19</td>
<td>397.41</td>
</tr>
<tr>
<td>9</td>
<td>361.86</td>
<td>361.22</td>
<td>360.59</td>
<td>359.96</td>
<td>359.35</td>
<td>358.71</td>
<td>358.09</td>
<td>357.47</td>
<td>356.83</td>
<td>356.23</td>
</tr>
<tr>
<td>10</td>
<td>327.40</td>
<td>326.88</td>
<td>326.36</td>
<td>325.84</td>
<td>325.33</td>
<td>324.82</td>
<td>324.32</td>
<td>323.81</td>
<td>323.29</td>
<td>322.78</td>
</tr>
<tr>
<td>11</td>
<td>298.93</td>
<td>298.49</td>
<td>298.06</td>
<td>297.65</td>
<td>297.20</td>
<td>296.77</td>
<td>296.35</td>
<td>295.92</td>
<td>295.50</td>
<td>295.08</td>
</tr>
<tr>
<td>12</td>
<td>275.01</td>
<td>274.65</td>
<td>274.29</td>
<td>273.92</td>
<td>273.56</td>
<td>273.18</td>
<td>272.83</td>
<td>272.47</td>
<td>272.11</td>
<td>271.75</td>
</tr>
<tr>
<td>13</td>
<td>254.64</td>
<td>254.33</td>
<td>254.02</td>
<td>253.71</td>
<td>253.39</td>
<td>253.08</td>
<td>252.76</td>
<td>252.46</td>
<td>252.15</td>
<td>251.85</td>
</tr>
<tr>
<td>14</td>
<td>237.08</td>
<td>236.81</td>
<td>236.54</td>
<td>236.27</td>
<td>236.00</td>
<td>235.73</td>
<td>235.46</td>
<td>235.19</td>
<td>234.92</td>
<td>234.65</td>
</tr>
<tr>
<td>15</td>
<td>221.78</td>
<td>221.54</td>
<td>221.31</td>
<td>221.07</td>
<td>220.83</td>
<td>220.59</td>
<td>220.36</td>
<td>220.12</td>
<td>219.89</td>
<td>219.66</td>
</tr>
<tr>
<td>16</td>
<td>208.34</td>
<td>208.13</td>
<td>207.92</td>
<td>207.71</td>
<td>207.50</td>
<td>207.29</td>
<td>207.09</td>
<td>206.88</td>
<td>206.67</td>
<td>206.46</td>
</tr>
<tr>
<td>17</td>
<td>196.44</td>
<td>196.24</td>
<td>196.06</td>
<td>195.87</td>
<td>195.69</td>
<td>195.50</td>
<td>195.32</td>
<td>195.13</td>
<td>194.95</td>
<td>194.76</td>
</tr>
<tr>
<td>18</td>
<td>185.82</td>
<td>185.64</td>
<td>185.48</td>
<td>185.31</td>
<td>185.15</td>
<td>184.98</td>
<td>184.82</td>
<td>184.65</td>
<td>184.49</td>
<td>184.32</td>
</tr>
<tr>
<td>19</td>
<td>176.29</td>
<td>176.14</td>
<td>175.99</td>
<td>175.84</td>
<td>175.69</td>
<td>175.54</td>
<td>175.39</td>
<td>175.24</td>
<td>175.09</td>
<td>174.94</td>
</tr>
<tr>
<td>20</td>
<td>167.69</td>
<td>167.54</td>
<td>167.41</td>
<td>167.27</td>
<td>167.14</td>
<td>167.00</td>
<td>166.87</td>
<td>166.73</td>
<td>166.60</td>
<td>166.47</td>
</tr>
<tr>
<td>21</td>
<td>159.89</td>
<td>159.76</td>
<td>159.64</td>
<td>159.51</td>
<td>159.39</td>
<td>159.27</td>
<td>159.15</td>
<td>159.02</td>
<td>158.90</td>
<td>158.78</td>
</tr>
<tr>
<td>22</td>
<td>152.78</td>
<td>152.67</td>
<td>152.56</td>
<td>152.45</td>
<td>152.33</td>
<td>152.22</td>
<td>152.11</td>
<td>151.99</td>
<td>151.88</td>
<td>151.77</td>
</tr>
<tr>
<td>23</td>
<td>146.28</td>
<td>146.17</td>
<td>146.07</td>
<td>145.97</td>
<td>145.86</td>
<td>145.76</td>
<td>145.66</td>
<td>145.56</td>
<td>145.46</td>
<td>145.35</td>
</tr>
<tr>
<td>24</td>
<td>140.31</td>
<td>140.21</td>
<td>140.12</td>
<td>140.02</td>
<td>139.93</td>
<td>139.83</td>
<td>139.74</td>
<td>139.64</td>
<td>139.55</td>
<td>139.45</td>
</tr>
<tr>
<td>25</td>
<td>134.81</td>
<td>134.73</td>
<td>134.64</td>
<td>134.55</td>
<td>134.46</td>
<td>134.37</td>
<td>134.29</td>
<td>134.20</td>
<td>134.11</td>
<td>134.02</td>
</tr>
<tr>
<td>26</td>
<td>129.72</td>
<td>129.64</td>
<td>129.56</td>
<td>129.48</td>
<td>129.40</td>
<td>129.31</td>
<td>129.23</td>
<td>129.15</td>
<td>129.07</td>
<td>128.99</td>
</tr>
<tr>
<td>27</td>
<td>125.01</td>
<td>124.93</td>
<td>124.86</td>
<td>124.78</td>
<td>124.71</td>
<td>124.63</td>
<td>124.55</td>
<td>124.47</td>
<td>124.40</td>
<td>124.32</td>
</tr>
<tr>
<td>28</td>
<td>120.62</td>
<td>120.55</td>
<td>120.48</td>
<td>120.41</td>
<td>120.34</td>
<td>120.27</td>
<td>120.20</td>
<td>120.13</td>
<td>120.06</td>
<td>119.99</td>
</tr>
<tr>
<td>30</td>
<td>112.71</td>
<td>112.65</td>
<td>112.59</td>
<td>112.52</td>
<td>112.46</td>
<td>112.40</td>
<td>112.34</td>
<td>112.28</td>
<td>112.22</td>
<td>112.16</td>
</tr>
</tbody>
</table>
# Telescope

**Table V.—continued.**

<table>
<thead>
<tr>
<th>True Angle</th>
<th>40°</th>
<th>41°</th>
<th>42°</th>
<th>43°</th>
<th>44°</th>
<th>45°</th>
<th>46°</th>
<th>47°</th>
<th>48°</th>
<th>49°</th>
</tr>
</thead>
<tbody>
<tr>
<td>1°</td>
<td>2062.62</td>
<td>2042.2</td>
<td>2022.1</td>
<td>2002.54</td>
<td>1983.28</td>
<td>1964.4</td>
<td>1945.85</td>
<td>1927.68</td>
<td>1909.82</td>
<td>1892.31</td>
</tr>
<tr>
<td>2°</td>
<td>1289.13</td>
<td>1281.13</td>
<td>1273.22</td>
<td>1265.41</td>
<td>1257.7</td>
<td>1250.06</td>
<td>1242.55</td>
<td>1235.10</td>
<td>1227.75</td>
<td>1220.47</td>
</tr>
<tr>
<td>3°</td>
<td>937.55</td>
<td>933.27</td>
<td>929.15</td>
<td>924.94</td>
<td>920.81</td>
<td>916.72</td>
<td>912.66</td>
<td>908.64</td>
<td>904.65</td>
<td>900.72</td>
</tr>
<tr>
<td>4°</td>
<td>736.65</td>
<td>734.03</td>
<td>731.43</td>
<td>728.83</td>
<td>726.27</td>
<td>723.72</td>
<td>721.19</td>
<td>718.69</td>
<td>716.18</td>
<td>713.71</td>
</tr>
<tr>
<td>5°</td>
<td>606.65</td>
<td>604.87</td>
<td>603.1</td>
<td>601.35</td>
<td>599.6</td>
<td>597.86</td>
<td>596.12</td>
<td>594.41</td>
<td>592.71</td>
<td>591.01</td>
</tr>
<tr>
<td>6°</td>
<td>515.65</td>
<td>514.36</td>
<td>513.00</td>
<td>511.81</td>
<td>510.55</td>
<td>509.29</td>
<td>508.04</td>
<td>506.78</td>
<td>505.52</td>
<td>504.30</td>
</tr>
<tr>
<td>7°</td>
<td>448.40</td>
<td>447.42</td>
<td>446.45</td>
<td>445.49</td>
<td>444.53</td>
<td>443.57</td>
<td>442.62</td>
<td>441.67</td>
<td>440.73</td>
<td>439.79</td>
</tr>
<tr>
<td>8°</td>
<td>396.66</td>
<td>395.88</td>
<td>395.12</td>
<td>394.37</td>
<td>393.63</td>
<td>392.88</td>
<td>392.13</td>
<td>391.38</td>
<td>390.64</td>
<td>389.90</td>
</tr>
<tr>
<td>9°</td>
<td>355.62</td>
<td>355.01</td>
<td>354.40</td>
<td>353.79</td>
<td>353.18</td>
<td>352.56</td>
<td>351.93</td>
<td>351.35</td>
<td>350.78</td>
<td>350.18</td>
</tr>
<tr>
<td>10°</td>
<td>322.28</td>
<td>321.78</td>
<td>321.28</td>
<td>320.78</td>
<td>320.28</td>
<td>319.79</td>
<td>319.29</td>
<td>318.79</td>
<td>318.30</td>
<td>317.81</td>
</tr>
<tr>
<td>11°</td>
<td>294.66</td>
<td>294.24</td>
<td>293.82</td>
<td>293.40</td>
<td>292.98</td>
<td>292.56</td>
<td>292.15</td>
<td>291.73</td>
<td>291.32</td>
<td>290.92</td>
</tr>
<tr>
<td>12°</td>
<td>271.40</td>
<td>271.04</td>
<td>270.68</td>
<td>270.32</td>
<td>269.97</td>
<td>269.62</td>
<td>269.28</td>
<td>268.93</td>
<td>268.59</td>
<td>268.23</td>
</tr>
<tr>
<td>13°</td>
<td>251.54</td>
<td>251.24</td>
<td>250.93</td>
<td>250.62</td>
<td>250.32</td>
<td>250.02</td>
<td>249.71</td>
<td>249.41</td>
<td>249.11</td>
<td>248.81</td>
</tr>
<tr>
<td>14°</td>
<td>234.38</td>
<td>234.11</td>
<td>233.84</td>
<td>233.57</td>
<td>233.31</td>
<td>233.05</td>
<td>232.79</td>
<td>232.53</td>
<td>232.27</td>
<td>232.01</td>
</tr>
<tr>
<td>15°</td>
<td>219.43</td>
<td>219.19</td>
<td>218.96</td>
<td>218.72</td>
<td>218.49</td>
<td>218.26</td>
<td>218.03</td>
<td>217.80</td>
<td>217.57</td>
<td>217.34</td>
</tr>
<tr>
<td>16°</td>
<td>206.26</td>
<td>206.05</td>
<td>205.85</td>
<td>205.64</td>
<td>205.44</td>
<td>205.23</td>
<td>205.03</td>
<td>204.82</td>
<td>204.62</td>
<td>204.41</td>
</tr>
<tr>
<td>17°</td>
<td>194.58</td>
<td>194.40</td>
<td>194.22</td>
<td>194.03</td>
<td>193.85</td>
<td>193.67</td>
<td>193.49</td>
<td>193.31</td>
<td>193.13</td>
<td>192.95</td>
</tr>
<tr>
<td>18°</td>
<td>184.16</td>
<td>183.99</td>
<td>183.83</td>
<td>183.67</td>
<td>183.51</td>
<td>183.34</td>
<td>183.18</td>
<td>183.01</td>
<td>182.85</td>
<td>182.69</td>
</tr>
<tr>
<td>19°</td>
<td>174.79</td>
<td>174.64</td>
<td>174.49</td>
<td>174.34</td>
<td>174.20</td>
<td>174.05</td>
<td>173.91</td>
<td>173.76</td>
<td>173.62</td>
<td>173.47</td>
</tr>
<tr>
<td>20°</td>
<td>166.34</td>
<td>166.20</td>
<td>166.07</td>
<td>165.94</td>
<td>165.81</td>
<td>165.67</td>
<td>165.54</td>
<td>165.41</td>
<td>165.28</td>
<td>165.14</td>
</tr>
<tr>
<td>21°</td>
<td>158.66</td>
<td>158.54</td>
<td>158.42</td>
<td>158.29</td>
<td>158.17</td>
<td>158.05</td>
<td>157.93</td>
<td>157.81</td>
<td>157.69</td>
<td>157.57</td>
</tr>
<tr>
<td>22°</td>
<td>151.66</td>
<td>151.54</td>
<td>151.43</td>
<td>151.32</td>
<td>151.21</td>
<td>151.10</td>
<td>150.99</td>
<td>150.88</td>
<td>150.77</td>
<td>150.66</td>
</tr>
<tr>
<td>23°</td>
<td>145.25</td>
<td>145.14</td>
<td>145.04</td>
<td>144.94</td>
<td>144.84</td>
<td>144.74</td>
<td>144.64</td>
<td>144.54</td>
<td>144.44</td>
<td>144.34</td>
</tr>
<tr>
<td>24°</td>
<td>139.36</td>
<td>139.26</td>
<td>139.17</td>
<td>139.09</td>
<td>138.99</td>
<td>138.89</td>
<td>138.80</td>
<td>138.70</td>
<td>138.61</td>
<td>138.52</td>
</tr>
<tr>
<td>25°</td>
<td>133.93</td>
<td>133.94</td>
<td>133.86</td>
<td>133.67</td>
<td>133.59</td>
<td>133.50</td>
<td>133.42</td>
<td>133.33</td>
<td>133.25</td>
<td>133.16</td>
</tr>
<tr>
<td>26°</td>
<td>128.01</td>
<td>128.82</td>
<td>128.74</td>
<td>128.66</td>
<td>128.58</td>
<td>128.49</td>
<td>128.41</td>
<td>128.33</td>
<td>128.25</td>
<td>128.18</td>
</tr>
<tr>
<td>27°</td>
<td>124.25</td>
<td>124.17</td>
<td>124.10</td>
<td>124.02</td>
<td>123.95</td>
<td>123.88</td>
<td>123.80</td>
<td>123.72</td>
<td>123.65</td>
<td>123.58</td>
</tr>
<tr>
<td>28°</td>
<td>119.92</td>
<td>119.85</td>
<td>119.78</td>
<td>119.71</td>
<td>119.64</td>
<td>119.57</td>
<td>119.50</td>
<td>119.43</td>
<td>119.36</td>
<td>119.29</td>
</tr>
<tr>
<td>29°</td>
<td>115.87</td>
<td>115.80</td>
<td>115.74</td>
<td>115.67</td>
<td>115.61</td>
<td>115.54</td>
<td>115.48</td>
<td>115.42</td>
<td>115.36</td>
<td>115.29</td>
</tr>
<tr>
<td>30°</td>
<td>112.10</td>
<td>112.04</td>
<td>111.98</td>
<td>111.91</td>
<td>111.85</td>
<td>111.79</td>
<td>111.73</td>
<td>111.67</td>
<td>111.61</td>
<td>111.55</td>
</tr>
</tbody>
</table>
**TELESCOPE.**

Table V.—continued.

<table>
<thead>
<tr>
<th>True Angle</th>
<th>50&quot;</th>
<th>51&quot;</th>
<th>52&quot;</th>
<th>53&quot;</th>
<th>54&quot;</th>
<th>55&quot;</th>
<th>56&quot;</th>
<th>57&quot;</th>
<th>58&quot;</th>
<th>59&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>1°</td>
<td>1875.11</td>
<td>1858.21</td>
<td>1841.62</td>
<td>1825.32</td>
<td>1809.3</td>
<td>1793.6</td>
<td>1778.12</td>
<td>1762.92</td>
<td>1747.95</td>
<td>1733.29</td>
</tr>
<tr>
<td>2°</td>
<td>1213.3</td>
<td>1206.2</td>
<td>1199.2</td>
<td>1192.24</td>
<td>1185.42</td>
<td>1178.64</td>
<td>1171.93</td>
<td>1165.3</td>
<td>1158.77</td>
<td>1152.3</td>
</tr>
<tr>
<td>3°</td>
<td>896.8</td>
<td>892.9</td>
<td>889.06</td>
<td>885.24</td>
<td>881.46</td>
<td>877.72</td>
<td>873.97</td>
<td>870.3</td>
<td>866.65</td>
<td>863.02</td>
</tr>
<tr>
<td>4°</td>
<td>711.25</td>
<td>708.8</td>
<td>706.37</td>
<td>703.96</td>
<td>701.57</td>
<td>699.18</td>
<td>696.81</td>
<td>694.49</td>
<td>692.15</td>
<td>689.83</td>
</tr>
<tr>
<td>5°</td>
<td>589.32</td>
<td>587.64</td>
<td>585.96</td>
<td>584.39</td>
<td>582.65</td>
<td>581.02</td>
<td>579.38</td>
<td>577.76</td>
<td>575.15</td>
<td>574.55</td>
</tr>
<tr>
<td>6°</td>
<td>503.08</td>
<td>501.85</td>
<td>500.63</td>
<td>499.42</td>
<td>498.22</td>
<td>497.02</td>
<td>495.82</td>
<td>494.63</td>
<td>493.45</td>
<td>492.27</td>
</tr>
<tr>
<td>7°</td>
<td>438.86</td>
<td>437.92</td>
<td>436.98</td>
<td>436.07</td>
<td>435.15</td>
<td>434.24</td>
<td>433.32</td>
<td>432.42</td>
<td>431.51</td>
<td>430.61</td>
</tr>
<tr>
<td>8°</td>
<td>389.17</td>
<td>388.44</td>
<td>387.71</td>
<td>386.98</td>
<td>386.25</td>
<td>385.54</td>
<td>384.81</td>
<td>384.10</td>
<td>383.39</td>
<td>382.67</td>
</tr>
<tr>
<td>9°</td>
<td>349.59</td>
<td>348.99</td>
<td>348.41</td>
<td>347.82</td>
<td>347.25</td>
<td>346.66</td>
<td>346.08</td>
<td>345.49</td>
<td>344.92</td>
<td>344.34</td>
</tr>
<tr>
<td>10°</td>
<td>317.32</td>
<td>316.83</td>
<td>316.35</td>
<td>315.85</td>
<td>315.38</td>
<td>314.90</td>
<td>314.42</td>
<td>313.94</td>
<td>313.47</td>
<td>312.99</td>
</tr>
<tr>
<td>11°</td>
<td>290.51</td>
<td>290.07</td>
<td>289.68</td>
<td>289.28</td>
<td>288.88</td>
<td>288.47</td>
<td>288.07</td>
<td>287.67</td>
<td>287.27</td>
<td>286.87</td>
</tr>
<tr>
<td>12°</td>
<td>267.87</td>
<td>267.52</td>
<td>267.18</td>
<td>266.83</td>
<td>266.49</td>
<td>266.15</td>
<td>265.81</td>
<td>265.46</td>
<td>265.12</td>
<td>264.78</td>
</tr>
<tr>
<td>13°</td>
<td>248.51</td>
<td>248.21</td>
<td>247.91</td>
<td>247.61</td>
<td>247.31</td>
<td>247.02</td>
<td>246.72</td>
<td>246.42</td>
<td>246.13</td>
<td>245.83</td>
</tr>
<tr>
<td>14°</td>
<td>231.75</td>
<td>231.49</td>
<td>231.23</td>
<td>230.97</td>
<td>230.72</td>
<td>230.47</td>
<td>230.22</td>
<td>229.96</td>
<td>229.70</td>
<td>229.44</td>
</tr>
<tr>
<td>15°</td>
<td>217.12</td>
<td>216.89</td>
<td>216.66</td>
<td>216.43</td>
<td>216.21</td>
<td>215.98</td>
<td>215.75</td>
<td>215.52</td>
<td>215.30</td>
<td>215.08</td>
</tr>
<tr>
<td>16°</td>
<td>204.21</td>
<td>204.00</td>
<td>203.80</td>
<td>203.60</td>
<td>203.40</td>
<td>203.21</td>
<td>203.01</td>
<td>202.81</td>
<td>202.61</td>
<td>202.41</td>
</tr>
<tr>
<td>17°</td>
<td>192.77</td>
<td>192.59</td>
<td>192.41</td>
<td>192.23</td>
<td>192.05</td>
<td>191.87</td>
<td>191.69</td>
<td>191.51</td>
<td>191.33</td>
<td>191.15</td>
</tr>
<tr>
<td>18°</td>
<td>182.53</td>
<td>182.37</td>
<td>182.21</td>
<td>182.05</td>
<td>181.89</td>
<td>181.73</td>
<td>181.57</td>
<td>181.41</td>
<td>181.25</td>
<td>181.09</td>
</tr>
<tr>
<td>19°</td>
<td>173.33</td>
<td>173.18</td>
<td>173.04</td>
<td>172.89</td>
<td>172.75</td>
<td>172.60</td>
<td>172.46</td>
<td>172.31</td>
<td>172.17</td>
<td>172.03</td>
</tr>
<tr>
<td>20°</td>
<td>165.01</td>
<td>164.88</td>
<td>164.75</td>
<td>164.61</td>
<td>164.48</td>
<td>164.35</td>
<td>164.22</td>
<td>164.09</td>
<td>163.96</td>
<td>163.83</td>
</tr>
<tr>
<td>21°</td>
<td>157.45</td>
<td>157.33</td>
<td>157.21</td>
<td>157.09</td>
<td>156.97</td>
<td>156.85</td>
<td>156.73</td>
<td>156.61</td>
<td>156.49</td>
<td>156.37</td>
</tr>
<tr>
<td>22°</td>
<td>150.55</td>
<td>150.44</td>
<td>150.33</td>
<td>150.22</td>
<td>150.11</td>
<td>150.01</td>
<td>149.90</td>
<td>149.79</td>
<td>149.68</td>
<td>149.57</td>
</tr>
<tr>
<td>23°</td>
<td>144.24</td>
<td>144.14</td>
<td>144.04</td>
<td>143.94</td>
<td>143.84</td>
<td>143.74</td>
<td>143.64</td>
<td>143.54</td>
<td>143.44</td>
<td>143.34</td>
</tr>
<tr>
<td>24°</td>
<td>138.43</td>
<td>138.33</td>
<td>138.24</td>
<td>138.15</td>
<td>138.06</td>
<td>137.96</td>
<td>137.87</td>
<td>137.78</td>
<td>137.69</td>
<td>137.60</td>
</tr>
<tr>
<td>25°</td>
<td>133.07</td>
<td>132.98</td>
<td>132.90</td>
<td>132.81</td>
<td>132.73</td>
<td>132.64</td>
<td>132.56</td>
<td>132.47</td>
<td>132.39</td>
<td>132.31</td>
</tr>
<tr>
<td>26°</td>
<td>128.10</td>
<td>128.03</td>
<td>127.95</td>
<td>127.87</td>
<td>127.79</td>
<td>127.71</td>
<td>127.63</td>
<td>127.56</td>
<td>127.48</td>
<td>127.41</td>
</tr>
<tr>
<td>27°</td>
<td>123.51</td>
<td>123.43</td>
<td>123.36</td>
<td>123.28</td>
<td>123.21</td>
<td>123.13</td>
<td>123.06</td>
<td>122.98</td>
<td>122.91</td>
<td>122.84</td>
</tr>
<tr>
<td>28°</td>
<td>119.22</td>
<td>119.16</td>
<td>119.09</td>
<td>119.02</td>
<td>118.95</td>
<td>118.88</td>
<td>118.81</td>
<td>118.74</td>
<td>118.67</td>
<td>118.60</td>
</tr>
<tr>
<td>29°</td>
<td>115.23</td>
<td>115.17</td>
<td>115.11</td>
<td>115.04</td>
<td>114.98</td>
<td>114.91</td>
<td>114.85</td>
<td>114.78</td>
<td>114.72</td>
<td>114.66</td>
</tr>
<tr>
<td>30°</td>
<td>111.49</td>
<td>111.43</td>
<td>111.37</td>
<td>111.31</td>
<td>111.25</td>
<td>111.19</td>
<td>111.13</td>
<td>111.07</td>
<td>111.01</td>
<td>110.95</td>
</tr>
</tbody>
</table>
Constitution and Use of the Tables.—We have already explained the constitution and use of Tables I., II., which are required to be adapted to the particular telescope with which any given micrometer is used; and we have also explained how the value of a single division, or turn of a screw, is ascertained by means of the fun's diameter: but this method gives a derivative rather than an original independent value to the micrometrical scale; for if the fun's diameter be not truly given in the Nautical Almance (and the late Dr. Maskelyne had reason to alter it in the latest years of his life), the error of this measure will be introduced into the scale derived from it. Table III. is therefore inserted, as affording the ready means of obtaining an independent scale from actual terrestrial measurement. We have already shown how the table of corrections is constructed in this table; and the reader will have no difficulty in taking out the proper numbers, as corrections to be added to the true angle, in order to convert it into the apparent or measured angle, if he be careful to take the minutes of the given angle from the left-hand vertical column, and the seconds from the horizontal line at the top; for in every instance, the meeting of the two columns will contain the additive quantity that is to be applied to the true angle, in order to obtain what the telescope will give when the value of its scale is once duly adjusted. For instance, suppose the true angle 14° 20', where 14 is taken at the side, and 20' at the top, the junction of the two columns gives 6.28', which shows that this quantity must be added to 14° 20' to form the true angle, to make 14° 28.28'. The apparent angle, as measured by a telescope of 63.5 inches focal length, is 14° 20.28'. If now this angle, reduced into seconds, be divided by the turns of the screw, or divisions on any scale used as a micrometrical scale, the quotient will be the value in seconds of one turn, or division, as the case may be, provided the angle in question be that which a true yard actually subtends at a known distance. For example, when a yard of 36 exact inches was erected at the distance of 190.98 yards, the micrometer of Troughton, attached to Tuley's 63.5 inch telescope, measured it by 34.78 revolutions of the screw; and by Table V. the true angle, read as in Table III., at the side and top, corresponding to this distance, is 18° 8'. The additive quantity belonging to this angle, as taken from Table III., is +6° 8'. and therefore the apparent angle, if measured by the said telescope, would be 18° 4'.89; therefore 18° 4'.89 = 31.33 is the value of one revolution of the screw, which is very nearly the same as was determined from the fun, and before tabulated. This coincidence of the celestial and terrestrial measures affords a convincing proof that the scale has been duly appreciated. We have said, that this table of corrections, and also the following one, which we shall explain presently, are computed exclusively for a telescope of 63.5 inches focus, being that which is represented, with a Troughton's micrometer attached, in fig. 6. of Plate XXIX.; and that each different telescope ought to have its own tables of corrections corresponding to its focal length, which limitation is required by the theorem on which we have grounded our calculations. But as the distance, which is the varying term, is the same for all telescopes, we find that in practice the corrections of any other telescope will be nearly proportionate to their respective focal lengths, that they may be taken exactly as such, without any sensible error: that is, the error arising from the table of corrections will be always as small as the error of observation in ordinary telescopes, unless the distance be very small, and its correction consequently great. On this account, Table III., and also Table IV., which, it will be seen, is derived from it, like Table V., may be considered as general tables, admitting of proportional parts of their whole corrections to be taken as suitable corrections for telescopes of other dimensions. This consideration is of great importance, with respect to the general utility of our tables of correction; and therefore the reader shall not depend solely on the authority of our bare assertion. We have already computed the correction for a telescope of 63.5 inches focal length, to be added when the true angle is 34° 59', or distance 100 yards, and found it 37° 68; let us see what it will be with the same data, when the telescope has just one half of the said focal length; here we have 1.764 = .882 of a yard for the focal length; then 12 882 x .882 = 77924 100 - 882 = .00785 = r, the elongation of the focus, and .882 x .00785 x 34°.99 = 35°3, or 35° 18' for the apparent angle, from which, if we subtract 34° 59', the true angle, the difference 18° 6 will be the corresponding correction, which differs only a quarter of a second from 37° 68, or half the correction of the telescope of double dimensions. Beyond 100 yards distance, the error, small as it is, will continue to diminish as the distance increases, and a smaller distance will seldom require to be measured in this way. The accuracy of this conclusion has been still farther corroborated by actual experiment; a graduated staff was placed erect at a distance, by measurement of a Troughton's chain of five-feet links, of 261.9 yards, and the two telescopes of 63.5 and 45.75 inches focal length, were tried against each other thus; a yard by the first was found, with Troughton's micrometer, to be equal to 25.33 turns; and by the second, with the same instrument, to be 18.19; the true angle belonging to this distance by Table V. is 13° 7'.54'; and the correction for the larger telescope by Table III. +5° 25'; therefore, taking 45° 75' 63.5 or .72 of 5° 25' is 3° 8 for the correction of the smaller telescope, we have the following values of the respective scales; viz. 13° 7'.54 + 5° 25' = 31° 29.84, &c. and 15° 7'.54 + 3° 8 18.19 = 43° 504, which values accord very nearly with those that had been previously determined by a series of solar measures, and the latter of them exactly, as far as to the third place in the decimal figures. Table IV. is the table to be used with Table V. for finding the true angle from the apparent one, and then the true distance at once from this true angle; its corrections are arranged somewhat differently from those in Table III., and have an opposite sign, but are borrowed from Table III. in such way, that by means of a little transposition, the terms of one may be converted into those of the other; as, for example, at the apparent angle 18° 40', in Table IV., the correction is -10° 44', and the true angle consequently 18° 29'.6; and at 18° 30', the nearest numbers for the true angle in Table III., the correction is +10° 44', which makes its corresponding apparent angle 18° 40'.44. In the former of these two tables, the correction is calculated to the hundredth part of a second; it being that from which the scale has its value appreciated; but in the latter, it was deemed convenient to leave out the hundredth parts, as being
being beyond the powers of the telescope, or rather of the human eye, when a single observation is taken.

Before Table V. was constructed, it was found by plane trigonometry, that one yard will subtend an angle of one minute at 3437.7 yards distance; and, as the distance decreases in the same ratio in which the angle increases, the table was made by a continual reduction of this number into halves, thirds, fourths, &c. as far as to 30', and all the intermediate seconds from 1' to 30', were interfered with their corresponding distances. For instance, at the true angle of 18' 30', the true distance is 185.82 yards; it being always understood, that the measured angle is subtended by an exact yard placed at right angles to the line of sight, in either a vertical or horizontal position, and that the correction taken from Table IV. has been applied to the measured or apparent angle. If two yards should be used as the opposite object at a great distance, then half the angle must be taken; but if half a yard only be used at small distances, then double the angle will be proper; and should the distance be within 110.95 yards, the smallest distance contained in the table; in which case the angle will exceed 30': the distance belonging

With telescope 30.15 in. 24.59 revol. = 27 2.9 (by Tables I. and II.) - 10.4 (by Table IV.) = 26 5.5
45.75 in. 37.53 revol. = 27 10.5
63.5 in. 52.25 revol. = 27 15.43
118.8 in. 98.52 revol. = 27 35.4

Average = 26 53.77

By Table V. the distance corresponding to this angle is 127.81 yards; and by measurement of a good chain, it was afterwards found to be 5.808 × 22 = 127.776 yards, the difference or error being only .034 of a yard, or something less than an inch and a half. During the observations, the sun was obscured by clouds, and the object viewed had no vibratory motion, which is a circumstance essential to be attended to.

With Dollond's divided object-glasses applied to the telescope of 45.75, the measure was 2 in. 11 div. 19 ver., or 1294 of the vernier, which, multiplied by 1/24, the polar

With telescope 45.75 in. 27.59 revol. = 20 0.4 - 8.6 (correction) = 19 51.5
63.5 in. 38.48 revol. = 20 4.4 - 12 - = 19 52.4

Average = 19 51.95

may be considered rather as a geometrical than an optical error: our experiments have convinced us that a small angle may be measured by Troughton's micrometer, when the thickest of the spindle's line is allowed for, (viz. 1/60th of a turn of the screw in our micrometer,) so accurately, that the error of observation in favourable weather will seldom exceed one second; but the error in distance, corresponding to an error of one second in the measured angle, increases in the duplicate ratio of the distance, and consequently becomes too considerable to be admissible beyond a limited distance; for instance, at the distance of 220 yards, or the eighth of a mile, an error of 1" in the angle subtended by a yard produces only an error of 0.23 of a yard in distance; but at 440 yards, or a quarter of a mile, the error in distance corresponding to the same error in the angle is 0.92; that is, at twice the distance the geometrical error is four times augmented; which circumstance limits
limits the distance at which micrometrical measurements in longining can be usefully employed at one station. What may be called the optical error, or that which arises from want of parallelism in the rays of light on entering the object-glass, and is allowed for in our fourth table, on the contrary, decreases with an increase of distance, and very nearly in a sub-duplicate ratio; so that the correction arising out of this optical error becomes insensible at no very great distance in telescopes of ordinary dimensions: for instance, at 220 yards, or its angle 15° 38', the correction is — 7°.4 by our Table IV.; but at 440, or its angle 9° 49', the correction diminishes to 1° 9', or nearly a fourth of the former at double the distance. Hence there is a peculiar distance at which every separate telescope will have its optical error or correction reduced to 1°, or quantity of probable error of observation, beyond which distance the tabulated corrections may be disregarded in ordinary operations. With the telescope of 63.5 inches focus, the correction will be less than 1° at 590 yards distance; with that of 45.75 inches, at 537; and with that of 30.15 inches, at 430, the distance continuing to diminish with the diminishing length of the focus of each object-glass, but not in the same ratio; consequently, when the telescope is very short, and its power small, the optical error may be altogether disregarded, wherever such telescope can be of any real use; because, in all probability, this error will be less than the error of observation arising from want of power.

TELESCOPICAL STARS, such as are not visible to the naked eye, but discoverable only by the help of a telescope. See Star.

All stars left than that of the sixth magnitude are telescopic to a middling eye.

TELESE, in Geography, a town of Naples, in Lavora, the see of a bishop, who resides at Cerrato; 18 miles E.N.E. of Capua. N. lat. 41° 12'. E. long. 14° 32'.

TELESA, or TELESSA, in Ancient Geography, a town of Italy, in Sannium.

TELESCOPICAL, in Mineralogy. See Corundum.

TELESIO, BERNARDINO, in Biography, a modern philosopher, the descendant of an illustrious family at Cofenza, in Naples, was born in the year 1508 or 1509. Having received the early part of his education under an uncle at Milan, he accompanied him to Rome in 1525, and shared in the calamities which attended the sack and pillage of that city. At Padua, whither he afterwards removed, he applied himself with diligence to the study of mathematics and philosophy. Returning again to Rome, he formed an intimate acquaintance with several persons of distinguished character, and so much ingratiated himself with pope Pius IV. that he was offered the archbishopric of Cofenza, which he declined for himself and obtained for his brother. From Rome he retired to his native country, where he married in advanced age, and for a short time became professor of philosophy in the university of Naples. However, the place of his more constant residence was Cofenza, and here he established an academy called Cofentiusa. He passed the remainder of his life under the patronage of several personages of distinction, particularly Ferdinand, duke of Nocera; but afflicted by the infirmities of one of his sons, and by the calamities which attended his school of philosophy, he terminated his life in the year 1588. Telesio distinguished himself by his opposition to the physics of Aristotle, and employed mathematical principles in explaining the laws of nature. These were first divulged in a work printed at Rome in 1565, entitled "De Retur Natura juxta propria principia, Lib. II." and enlarged to nine books in an edition printed at Naples in 1586. The same system was maintained in other treatises, under the titles of "De his quae in Aere sunt, et de Terra Motibus," "De Mari," "De Colorum Genera," &c. His system was in its essence the doctrine of Parmenides, who taught, that the first principles in nature, by means of which all natural phenomena are produced, are cold and heat. (See Parmenides and Eleatic.)

Telesio's theory is thus developed: "Matter, which is in itself incapable of action, and admits neither of increase nor diminution, is acted upon by two contrary incorporeal principles, heat and cold. From the perpetual opposition of thee, arise the several forms of nature: the prevalence of cold in the lower regions producing the earth and terrestrial bodies, and that of heat in the superior regions, the heavens and celestial bodies. All the changes of natural bodies are owing to this conflict; and according to the degree in which each principle prevails, are the different degrees of density, reflectance, capacity, moisture, dryness, &c. which are found in different substances." This system is founded on the fanciful conversion of mere attributes and properties into substantial principles. For lord Bacon observes, that Telesio, no less than Plato and Aristotle, places abstractive notions at the basis of his system, and produces his world of real beings from non-entities. This eminent philosopher, however, characterizes him as a lover of truth and a benefactor to science; and one who prepared the way for subsequent improvements. After his death, his writings, as containing "innovations," were put into the Index Expurgatorius of the Inquisition. His philosophy, nevertheless, had many advocates, among whom was Campanella; and his works were republished at Venice, in 1590, by Antonio Perino, who wrote a compendium of his philosophy in the vernacular tongue. Telesio's style was more polished than that of other philosophers of his time; and he intermixed some Latin verses of considerable eloquence. Brucker in the Index.

TELESPHORUS, in Mythology, a deity invoked by the Greeks for health, together with Eufclapius and Hygeia. The figures of these three divinities occur on several medals; and on some we have Telephorus with Eufclapius alone, and on others with Hygeia.

The figure of Telephorus is invariably the same, viz. that of an infant clothed with a coat of cloak without sleeves, which enfolds his arms, descends below the knees, and has a kind of hood or cowl covering its head.

Montfaucon has given a particular description of this deity, the worship of which is supposed to have passed from Epidaurus to Rome, with that of Eufclapius.

TELETZKOI-OZER0, in Geography. See ALTIN.

TELETZKOI Mountain, deriving its name from the lake Teletzko-ozero, one of the greatest eminences of the Altai mountains (see ALTAI), and from which the river Oby issues. It forms, with its lofty summits, the boundary between Siberia and the Soungarey, strikes its powerful ridges down between the lake and the Katunia; and after having turned round the east side and the lake, unites with the Kuznetskoi mountains. This division is one of the greatest, but at the same time the coldest and most inaccessible, of all the Altai or mountains; hence it is, that its quality and contents are little known. This, however, is certain, that very powerful granite and porphyry mountains are in its range, and that the earth near and upon it yields jasper, flint breccia, hornfelsites, white (probably saltine) chalk-tilone, coloured marble, black schistus, marl, sand-tilone, and in

the...
these there are iron, argentaceous copper, and lead ores, 

erapitha, alpahthuister, &c. The mountains to the right of the 
Katunia seem to be particularly rich in ores.

TELEUTES, or TELEUGUTES, a tribe of Tartars, who 
are supposed to have derived their name from the lake Te 

gleu in the Altay mountains. They are also denominated 
by the Russians the white Kalmucks, because they formerly 
lived among the Soongarians. Abugla reckons them among 
the Mongolian races; but as their speech is manifestly a 
corrupt Tartarian, their origin may more confidently be 
derived from that nation. In the year 1560 they did homage 
for the first time to the Russian empire; but it was not till 
towards the middle of the 17th century, when some items of 
them removed higher up the Tom, that they became pro 
perly subjects of Russia: the greater part of them, however, 
remained with the Kalmucks. The former dwelt partly in 
the Tomskoi district of the Tobolskian, partly in the Kuf 
netinsk circle of the government of Kolyskyan; and their 
number is so small, that they only reckoned about 500 miles.

TELF, a town of the county of Tyrol, near the Inn; 
15 miles W.S.W. of Innsbruck.

TELSON, a town of Sweden, in Sudermanland, on the 
lake Moler; 15 miles S.W. of Stockholm.

TELGET, a town of Germany, in the bishopric 
Nurnber; 5 miles E.S.E. of Nurnber.

TELCHIOUAN, a town of Asiatic Turkey, in the 
government of Diarbekir; 30 miles S. of Diarbekir.

TELHEIM, a town of the duchy of Wurzburg; 7 miles 
S.S.W. of Schweinfurt.

TELHEIRO, a town of Portugal, in the province of 
Beira; 6 miles S.W. of Pinhel.

TELICA, a volcano of Mexico, near Tecoantepeque.

TELICARDIS, in Natural History, the name given by 
some authors to a stone found in the shape of a heart. 
It owes this figure to its having been found in the shell of 
some large bivalve of the cockle kind; and is more usually 
known among authors under the name of baccarides.

TELICUL, or TELECOL, in Geography, a lake of 
Russia, in the Altay mountains, about 120 miles in circum 
ference. N. lat. 43° 12'. E. long. 64° 14'.

TELIPHANO, in Botany, a name used by some au 
-thors for the doronicum, or leopard's bane.

TELL, William, in Biography, a celebrated Swis, was 
an inhabitant of middle rank of Burgel, in the canton of 
Uri, and son-in-law of Walter Furt. In 1307 he engaged in 
the conspiracy against the Austrian tyranny. Geffler, the 
German bailiff, suspected a plot, artfully contrived a scheme 
for ascertaining the extent of submission to the Austrian 
yoke. Accordingly he set up a hat upon a pole, and com 
manded that obedience should be paid to it. Tell refuted the 
command; and, as tradition reports, the arbitrary bai 
liff ordered him to float with an arrow at an apple placed 
on the head of his son. He clef the apple without hurting 
the child; and being observed to have another arrow, he 
was interrogated what he intended to do with it. He un 
hesitatingly replied, that if he had wounded his son, the 
other shaft should have been directed to the bailiff's heart. 
This bold declaration caused him to be imprisoned. Of 
this fact there is no doubt; though the incident of the arrow 
and apple may be fabulous, as is applied by Saxo 
Grammaticus to a Dane at an earlier period. The bailiff 
took Tell with him across the lake of Lucern, designing to 
convey him to another canton. In the passage, a storm 
 arose; and the vessel being in danger, the fettlers of Tell 
who was known to be a skilful boatman, were taken off, 
and the helm was committed to his hands. Availing his self 
of this circumstance, he steered to a rock and made his 
escape. Geffler on landing met with his fate from an arrow

of Tell, who afterwards retired to Staufscher in the canton 
of Schweitz; and on the following new-year's day, all the 
Austrian governors were fossil and dismissed from the coun 
try; and this circumstance is said to be the commencement of 
Swiss freedom. Tell's death is supposed to have been 
occasioned by an inundation at Burgel in the year 1354. 
His grateful countrymen erected a rude chapel to his honour 
on the spot where he refided, and another upon the rock on 
which he landed. His posterity, however, sunk into ob 
livion, without any permanent dilinction; the last who bore 
his name died in 1684, and the last of the female line in 

TELLA PASCHUM, in Natural History, a name given 
by the people of the East Indies to a kind of white arctic, 
or rat's-bane, found native among them.

It is well known to be a fatal poison, and used to destroy 
vermin. It lies in the cliffs of rivers among strata of stone 
in large white irregular lumps; when held to the fire, it 
emits copious fumes, smelling strongly of garlic and sulphur, 
but it does not readily melt or run.

TELLA SAGINUM, a name given by the natives of the East 
Indies to a kind of earth which they use externally to dry 
up ulcers, and internally in cases of coughs and colds. It 
is of the nature of the finer clays, and is found at the bot 
bottom of some of their rivers.

TELEGROD, in Geography, a morass on the shores 
of Norway and Lapland, which cannot be crossed without 
much apprehension of danger. During winter it is frozen 
to the depth of several yards, and does not thaw till the 
summer is far advanced. The surface may appear dry and 
solid, but as the heat penetrates downwards, the icy floor 
which supports it, softening and melting, bends and 
trembles under the shock of pressure, and at last gives way, 
so that horses, carriages, and passengers—all sink into the 
abyss. Near the mouth of the Fjord, or Firth, a bed of 
clay-marle is seen distinctly mixed with small shells. Ap 
pearances of a kind occur along the southern shores of 
Norway, and the fact is more remarkable, since no fos 
fill shells have been ever found in the interior of the country. 
This marle, however, is only a local formation, and rests on 
the fundamental gnits.

TELLER, an officer in the exchequer, of whom there 
are four: whole businesses is to receive all monies due to the 
crown, and thereupon to throw down a bill through a pipe 
into the tally-court, where it is received by the auditor's 
clerks, who attend there to write the words of the paid bill 
upon a tally, and then deliver it to be entered by the clerk 
of the pells, or his clerk.

The tally is then split or cleft by the two deputy cham 
bers, who have their seals; and while the senior deputy 
reads the one part, the junior examines the other part with 
the other two clerks.

The tellers' places are in the king's gift, and they have 
besides their chief clerk or deputy, and other clerks for the 
dispatch of businesses.

TELLER, Marcus, in Biography, a priest and musical 
composer in the church of St. Gervais, in Mafcricht, pub 
lished in 1725, his first work at Augsburg, under the title of 
"Musica sacra stylo plane Italicum et Chicronico 
Composita etruscet IX Motetts breviola de Tempore, et II Missas solemnes, &c." His second 
work was published; and published likewise under the 
solemn title of "Musica sacra," consisting of four masses 
and four motets, for four voices, two violins, tenor, basso, 
and a basso continuo, or figured base.

TELLER, Florian, an eminent dramatic composer of 
the music of grand opera ballets. In 1763 he composed 
music for the ballet of Orpheus and Euridice, for the 
Q q 

duke
Télles, in Geography, a sea-port of Africa, in the kingdom of Fez, on the coast of the Mediterranean; the harbour is small but safe, and the bottom good; 120 miles E.S.E. of Tangiers.

Télleschiéry, a city of Hindoostan, on the coast of Malabar, belonging to the English, and defended by lines. It was long besieged by the forces of Hyder Ali; but in the year 1782 the troops were defeated, the camp taken, and the general wounded and made prisoner by the British, under the command of major Abingdon. The situation of the town is beautiful and healthy; pepper is the great article of trade, and cardamoms; 48 miles N.N.W. of Calicut. N. lat. 11° 15'. E. long. 75° 20'.

Tellyco, a town of the state of Tennessee, with a block-house; 50 miles S.W. of Knoxville. N. lat. 35° 37'. E. long. 84° 18'.

Télliér, Michael, in Biography, a distinguished Jéfuit, was born in 1642, near Pire, in Lower Normandy. He studied at the Jéfuits' college at Caen, and entered into the society at eighteen years of age. Having for some time taught the schools, he was directed by his superiors to prepare an edition of Quintus Curtius, "in uffm Delphin," which was printed in 1678. He was afterwards elected, with other eminent brethren, to establish at the Jéfuits' college at Paris a society of learned men, who might retrieve the honour of the body; but his views were directed to other objects, and he became a zealous controversialist in the subjects of dispute between the Jéfuits and other orders. Accordingly, in 1687, he published "Défense des Nouveaux Croisés et des Millionnaires de la Chine, du Japon, et des Indes," which was attacked by Arnauld in his "Morale Pratique," and was announced to the holy office: and sentence of condemnation was avowed by a promise that Télliér should come to Rome, and make alterations in his work. This prepared the way for numerous publications; in consequence of which Télliér gained increasing reputation, and was advanced to the offices of revisor, réctor, and provincial. Upon the death of F. la Chaise in 1709, he was chosen, in competition with another candidate, and in consequence of an affumed air of modesty, to succeed him as confessor to the king. But whatever modesty he might assume to serve a present purpose, he had little true humility. Ardent, unsympathizing, and defpotical, he was hated by his brethren over whom he tyrannized, in the most unwarrantable manner. Fontenelle, who well knew his disposition and character, hearing of his appointment, said, "The Janenfills have sinned." His first act was the demolition of the famous house of Port Royal, which he razed to its foundation; he then forced upon the nation and the magistrates the bull Unigenitus; and he proceeded with such violence, that the Jéfuits themselves said, "Father le Télliér drives us at such a rate that he will overturn us," Télliér's conduct brought disgrace on the society, and was ultimately the chief occasion of its abolition. On the death of Louis XIV. he was exiled, first to Amiens, and afterwards to La Pléèche, where he died in 1719, at the age of seventy-five. The morals of Télliér were regular; and though some persons suspected him of hypocrisy, others have with greater probability believed, that he was actuated by a real zeal for the principles which he had adopted. He was a man of literature, wrote many works, and was a member of the Academy of Belles Lettres. Nouv. Dict. D'Alembert's Hift. of the Jéfuits.

Télligt, in Geography, a town of Germany, in the bishopric of Munster, with a rich abbey, on the Rhine; 3 miles from Munster.

Télliguso Mountains, or Iron Mountains. See Iron Mountains.

Téllinga, in Geography, a province of Hindoostan, now called Golconda.

Téllingstede, a town of the duchy of Holstein; 11 miles S.E. of Lunden.

Téllipoli, a town on the N. coast of the island of Ceylon; 9 miles N. of Jaffnapatam.

Télo, a town on the W. coast of the island of Célebes, and capital of a small kingdom, once united to Malacca. S. lat. 5°. E. long. 120° 21'.—Aifo, a town on the W. coast of the island of Lombok. S. lat. 8° 24'. E. long. 115° 45'.

Télo Langue, a town on the W. coast of Sumatra. N. lat. 8° 51'. E. long. 98° 21'.

Télo Pente, a cape on the W. coast of Sumatra. S. lat. 1° 50'. E. long. 100° 31'.

Téllonium. See Thélonium.

Téllonum, in Ancien Geography, a place of Gaul, in Aquitania, near the sea-coast, S.E. of Burdigala.

Téllow, in Geography, a town of Brandenburg. in the Middle Mark, famous for its turnips; 10 miles S. of Berlin. N. lat. 52° 23'. E. long. 13° 15'.

Télludopin, a town of the island of Celebes, in Buggenay bay. S. lat. 2° 35'.

Téllure, in Agriculture. See Téllier.

Téllurium, in Mineralogy, a metal discovered by Klaproth, combined with gold and silver, in the ores from the bannats of Temefwar, and in the Farzebay mountains in Transylvania. The ores of this metal are denominated native tellurium, graphic tellurium, yellow tellurium, and black tellurium ore.

Native Tellurium; Gedigen Syloan, Werner.—The colour is intermediate between tin and silver white, and sometimes inclines to steel-grey. This ore is found massive and disseminated; it is faid sometimes to occur crystallized in four-fooded prisms; it occurs also in small granular concretions. It yields to the knife, and is rather brittle. The specific gravity, according to Klaproth, is 6.15. Before the blowpipe, native tellurium melts easily before ignition; it burns with a greenish flame, and is entirely volatilized in a dense white vapour, which has the acid odour of horseradish. When exposed to a low heat, it is converted into a yellowish or blackish oxyd; by an increase of temperature it forms a dark brown or black glass; in which gold grains are intermixed; at a still higher heat the oxyd is entirely volatilized. The constituent parts are, according to Klaproth,

Tellurium 92-55
Iron 7-20
Gold 25

The proportion of gold is however variable. In the variety of native tellurium, Klaproth found 9 parts in the 100 of gold. Native tellurium occurs in veins with quartz and lithomarge. It is known, in the older works on mineralogy, by the name of aurum problematicum, aurum paradoxicum, and white gold ore.

Graphic Tellurium; Tellur natif graphic, Hauy.—This is worked as an ore of gold at Offenbanya, in Transylvania, where
where it has hitherto only been found. It is so called, from the particular appearance formed by the aggregation of the crystals; it occurs in veins in porphyry. The colour of graphic tellurium is flesh-grey, which is sometimes variegated by exposure to the air: it is also found white, yellow, or lead-grey. It has a shining metallic lustre. It occurs massive, disseminated in leaves, and crystallized in small compressed hexahedral prisms, either with or without tetrahedral summits, and generally arranged in rows on the surface of quartz. There are frequently other prisms attached to the extremities of the former, at right angles with them, giving the whole row an appearance of Perieploplonian characters. The planes of the crystals are smooth. “The massive variety, which is very rare, occurs in granular distinct concretions.” (Jameson’s Min.) It is soft, brittle, and fragile, and yields a lead-grey streak. The specific gravity is 5.723. Before the blow-pipe it burns with a green flame, and is volatilized. The constituent parts, according to Klaproth, are

<table>
<thead>
<tr>
<th>Tellurium</th>
<th>Gold</th>
<th>Silver</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>30</td>
<td>10</td>
</tr>
</tbody>
</table>

**Yellow Tellurium Ore.**—The colour of this ore is silver-white, passing into yellowish or brazen-white and grey. It occurs in grains, and in minute compressed four-sided prisms, with a lamellar structure and bright metallic lustre; it also occurs massive and reticulated; the specific gravity is 10.878. The constituent parts, according to Klaproth, are

<table>
<thead>
<tr>
<th>Tellurium</th>
<th>Gold</th>
<th>Lead</th>
<th>Silver</th>
<th>Sulphur</th>
</tr>
</thead>
<tbody>
<tr>
<td>44.75</td>
<td>26.75</td>
<td>19.5</td>
<td>8.5</td>
<td>3.0</td>
</tr>
</tbody>
</table>

This ore, which is worked for the gold and silver it contains, has hitherto been found only at Nagyag, in Transylvania. It occurs in small irregular veins in porphyry. The most frequent vein-figures are brown spars and quartzes: it is sometimes associated with red manganiferous ore, sulphuret of manganiferous, native arsenic, sulphide of antimony, and native gold.

**Black Tellurium Ore; Nagyager, Werner.**—The colour of this ore is between iron-black and dark lead-grey. It occurs massive and in leaves, and also crystallized, in the following forms: oblique four-sided tables, rectangular four-sided tables, and in small eight-sided tables, and in acute octahedrons acuminated at the summit. It has a splenulent metallic lustre, a more or less curved lamellar structure, with joints on cleavage in one direction. It yields easily to the knife, and is friable: the thin laminae are flexible; it flanks slightly when rubbed in the fingers. The specific gravity is 8.919. This ore melts very easily before the blow-pipe; the sulphur and tellurium are volatilized; a blackish round-coloured globule remains, which, on being melted with borax, yields a globule which contains gold alloyed with silver; the flag which remains tinges borax violet-blue. Its constituent parts, according to Klaproth, are

<table>
<thead>
<tr>
<th>Tellurium</th>
<th>Gold</th>
<th>Lead</th>
<th>Silver</th>
<th>Copper</th>
<th>Sulphur</th>
</tr>
</thead>
<tbody>
<tr>
<td>32.2</td>
<td>54.0</td>
<td>9.0</td>
<td>0.5</td>
<td>1.3</td>
<td>3.0</td>
</tr>
</tbody>
</table>

This ore is found associated with the preceding ore of tellurium. An ore of tellurium has lately been discovered in Norway by Esmark. An account of the mines where tellurium is obtained, was published by M. Stutz in the new Memoirs of the Society of Naturalists at Berlin, vol. ii. 1799, and by Esmark, entitled “An Account of a Mineralogical Journey through Hungary, Transylvania, and the Banat,” in the Neuen Bergmännischen Journal, vol. i. and ii. Dr. Clarke, in the 4th vol. of his Travels, has also recently given a description of the tellurium mines, from which we shall briefly extract the most interesting particulars at the close of the present article.

**Analysis of the Ores of Tellurium.**—These ores are worked for the gold and silver they contain; and the tellurium with which they are combined being extremely volatile at a low degree of heat, this metal was lost in the process of extraction, and was for a long time supposed to be antimony. Muller first suspected that it was a new metal. Bergmann made several experiments upon it, but left the question undecided.

Klaproth, in 1798, read an account of the discovery of this new metal in the public sitting of the Royal Academy of Sciences at Berlin.

The process of extracting the metal from native tellurium is as follows. Six parts of muriatic acid are poured on the crude ore, which has been previously separated as much as possible from its matrix, and mechanically divided. Heat is applied, and three parts of nitric acid are added by degrees. A violent effervescence takes place. By this process the metallic portion of the oxide is dissolved, leaving the matrix, which is principally quartz, behind. In the next place, the filtered solution is carefully diluted with as much water as it will bear without being rendered turbid. Cautious potash or soda is added, until the precipitate which is first produced disappears, and only a dark-brown limy residue remains.

Decant the solution, setting the residue apart for subsequent examination: it contains iron and gold. To the alkaline solution add muriatic acid, until it is saturated, most accurately observing the point of saturation. A copious white precipitate ensues, which in a raised temperature falls to the bottom of the vessel in the form of a heavy powder. It is then collected, and washed with equal parts of water and spirits of wine, and dried in a gentle warmth. This is the oxyd of tellurium. To reduce it to a metallic form, it should be heated in a small glass retort along with one-twelfth of its weight of charcoal, or it may be previously moistened with oil. Adapt a receiver to the retort, and let heat be applied till the powder be brought to a state of ignition. Small metallic drops will be seen rising the upper part of the retort, which fall down separately, and are succeeded by others. On refrigeration, the reduced metal (excepting some few metallic drops on the shoulder of the retort) is found fused, with a clean splendent surface, which is most frequently crystalline. At the moment the reduction takes place, a quantity of carbonic acid gas is suddenly generated, carrying along with it some particles of the mixture, which it deposits in the receiver. The other ores of tellurium being worked as gold ore; for their analysis, see Gold.

Tellurium in the pure reguline state was first obtained by Klaproth, who has given the following description of it: it is of a tin-white colour, verging to lead-grey; it has a very high metallic splendour, and a foliated structure; the surfaces of the fragments are very brilliant. When cooling slowly after fusion, it assumes a crystalline surface. It is very brittle, and easily reduced to powder. Among all the known fusible metals, except the metallic alkalies or earths, tellurium poises the least specific gravity, being only 6.185.

Tellurium melts sooner than antimony, when exposed to the same degree of heat, but later than lead. It inflames upon charcoal before the blowpipe with a violence resembling detonation, and with a vivid light-blue flame, which on the edges has a greenish tinge. By the continued action of the blowpipe, it is entirely dissipated in a greyish-white vapour, and emits a smell like that of征求ed radish.

Q 2

Tellurium
Tellurium amalgamates very imperfectly with mercury, even when heat is applied. It combines with sulphur in equal proportions when fused in a gentle heat, and forms a lead-coloured, frothy substance. With nitric acid, tellurium yields a limpid colourless solution, which is not rendered turbid by water. In the concentrated solution, very light, flender, needle-shaped crystals are formed, which commonly assume a dendrical arrangement. Muratic acid, on the addition of a little nitric acid, affords a similar clear solution of this metal. This fatured solution is decomposed by the mere addition of water, which throws down a white powder, but this is again dissolved on adding more water.

The powder thrown down is not a pure oxyd of tellurium, as it is combined with a small quantity of muriatic acid. If tellurium be exposed to one hundred times its weight of concentrated sulphuric acid, the acid gradually acquires a tinge of a fine deep amethystine red. This colour is destroyed by the addition of water, and by heat.

Carbonated and pure alkalis precipitate tellurium in the form of a white oxyd, combined with water or an hydrate. This is redissolved by an excess of alkali. Alkaline sulphures throw down a dark-brown or blackish precipitate. Tinure of galls produces a flocculent, yellow precipitate. The solutions of this metal in acids are not decomposed by prussic acid or potash, a property which tellurium possesses in common with gold, plata, iridium, osmium, rhodium, and antimony. Zinc and iron precipitate tellurium from its solution in acids, in the metallic state, in the shape of blackish flocculi, which acquire a metallic lustre by trituration. Plentifuls is gradually coated with metallic laminae in a muriatic solution of tellurium.

Oxyd of tellurium on charcoal is reduced with brisk effervescence, and afterwards volatilized; but if heated in a small glafs retort it fufes, and on refrrigation exhibits a straw-yellow colour and a fliqueted appearance. Some of these properties of pure metallic tellurium are common to native tellurium. Since the firft discovery of this metal by Klaproth, it has been further ascertained, that it combines with chlorine in the proportion of 100 parts of tellurium with 90.5 of chlorine. Tellurium forms two diftinct compounds with hydrogen, the one of which is folid, and the other gafeous. The firft is formed by making tellurium the negative furface in water in the Galvanic circuit; by this a brown powder is produced, which is a folid hydreur of tellurium. The fecd is formed by acting with dilute sulphuric acid upon the alloy of tellurium and potaffium, by which a peculiar gas is produced, having a smell reiembling that of sulphurated hydrogen. It is absorbed by water, and a claret-coloured folution refults, which by exposure to the air becomes brown, and deposits tellurium. After being wafted with a small quantity of water, this gas does not affect vegetable blue colours. It burns with a bluife flame, depofiting oxyd of tellurium, and unites with alkalis. It precipitates most metallic folutions, and is itself infantly decomposed by chlorine gas. It may be called tellurated hydrogen gas.

Tellurium is one of those metals whose oxyd poifles the characters of acids, and form diffiult classes of falt. The falt formed by a combination of a base with the oxyd of tellurium, are called Berzelius telluruts.

Tellurium, according to Klaproth, combines with oxygen in the proportion of 100 parts of the metal with 20.5 of oxygen; but Berzelius determines the proportions to be 100 tellurium and 27.83 oxygen.

This metal has not hitherto been applied to any useful purpofe in the arts, which may perhaps be attributed to its scarcity, and the comparative recenfters of its discovery.

Tellurium Miner.—"The mine of Nagyag is ditant about 15 miles from Deva, in the bannat of Temeswar: it is situated in the heights of the mountains, lying on the north side of the river Moros. After crossing the river, we began to climb these heights. The roads were not bad, but almost the whole journey to Nagyag was up a steep ascent. We were five hours, although drawn by four horses in a light car, before we reached the small town where the mine has been opened.

"As Transylvania is the only country in the whole world where tellurium has been discovered, our curiosity was greatly excited to view the Nagyag mine. At laft the prospect opened upon us with great boldness of scenery quite among the summits of this mountainous region, and in a manner highly picturesque and striking. The situation of the mine was distinguished by an immense heap of discarded minerals thrown out in working it.

"The whole village of Nagyag has been undermined; the works are not only carried on upon a grand and extensive scale, but they are conducted with a degree of neatness, for which the Germans have long been famous in mining. Some specimens of tellurium are fo exceedingly rich in gold, that in the fale of them for the crown, it is necessary to weigh them, and to estimate the price according to the quantity of gold they contain. This kind of ore is always kept locked up in private warehouses. The common ore has exposed in heaps, at which the workmen are busily employed in preparing the ore for flamping.

"When the mine was first discovered, the mountains around it were covered with forests, which have since been cut down to supply the mines with timber. The discovery of the mine is thus related on the respectable authority of baron Boon, in his letter to professor Feber. A Wallachian, whose name was Armenian John, came to my father, then possessed of a rich silver mine at Cuertes, telling him, that as he constantly observed flames issuing from and playing upon a fissure in the Nagyag forest, he was of opinion that rich ore might be hid under ground. My father was fortunate enough to listen to the poor man's tale; and accordingly he drove a gallery in the ground which the Wallachian had pointed out. The works went on some years without success, and my father had resolved to give them up. However, he made a laft drift towards the fissure, and there he discovered the black and lamellated gold ores, which were at first looked upon as iron glimmer, but proved, when aflayed, to be, what they really are, rich gold ores."

"Travels through the Bannt, Lond. 1799.

"Other veins were afterwards discovered running parallel to each other from north to south, and dipping from west to east. When Boon visited Nagyag, the mine had only been worked to the depth of 150 fathoms. Its depth is now 350 fathoms. The mountains are entirely composed of porphyry, covered with red clay or red slate and sandstone. The veins break off as soon as they reach the red slate. These veins contain with the ore, felspar and fat quartz. There is also found here a very rich kind of ore, which is finely woven into the texture of a reddish felspar. Among the rich ores, native silver occurs mixed with gold. Another variety is called by the miners cotton ore; it consists of little native silver and gold grains in tellurium, adhering to an argillaceous matrix. All the semi-metals at Nagyag are found, when carefully analyzed, to contain gold. According to Boon, the tellurium mines in the course of 20 years yielded above 4,000,000 florins in gold and silver. At the time of our arrival it had been worked 60 years, and was equally productive."

TELLUS, TERRA, &c, in Astronomy. See Earth.

TELMARA, in Ancient Geography, a town of Asia Minor, in Caria.

TELMEEN,
TELMEEN, in Geography, a town of Africa, in the country of Sahara, ancienfly called Almeeti; 50 miles W. of Gabes.

TELMES, a town of Morocco; 13 miles from Safi.

TELMISSUS, in Ancient Geography, a name given to three towns in Asia Minor, one at the distance of 30 miles from Halicarnassus, in Lydia; situated at the S.E. part of the gulf of Glaucus, 2½ leagues N.E. of the promontory Telnhus, and nearly S.W. of the mouth of the river Glaucus. Its inhabitants were famous for their skill in augury; this town had a very fine theatre:—the second was in Caria, and the third in Paphlagonia.

TELO MARTIUS, a port of Gallia Narbonensis. See Tolun.

TELOBIS, a town of Spain, in the Tarragonese, belonging to the Jactanis. Potl.

TELOBO, in Geography, a small island in the East Indian sea, near the west coast of Gilolo. S. lat. 1° 6'. L. long. 127° 15'.

TELON, a name given to the chemists to fire.

TELONAE, telesini, among the Athenians, farmers of the public revenues: for the severity with which they were handled, in case they failed, see Potter, Archæol. Grec. lib. i. c. 14. tom. i. p. 81.

TELONIUM. See TELONIUM.

TELONIUS, Salto, in Ancient Geography, a river of Italy, in the country of the Sabines. It sprang towards the S. of Carfeci, and ran N. to discharge itself into the Velinus.

TELOPEA, in Botany, from τῦλος, straining; at a distance, a name very suitable to this magnificent shrub, with its fine scarlet flowers.—Brown Tr. of Linn. Soc. v. 10. 197. Prodr. Nov. Holl. v. 1. 388. Ait. Hort. Kew. v. 1. 212.—Our Embotthrum speciosum, with E. turcatum of Labill. Nov. Holl. v. 1. 37. t. 44, constitute this genus. See EMBOTTHUM, from which we are unwilling to separate them, for the reasons given under OBERCALLE.

The extremely close natural affinity, and great resemblance, of these plants to each other, makes us mistrust even the technical character of the lateral fligma (omitted indeed in Hort. Kew.), supposing that organ to be really terminal in Embotthrum, which on a careful inspection we find reason to doubt. The efficient part of the fligma in E. coccinum is certainly oblique. We wish to learn, rather than to dictate, but we cannot confide implicitly in the most able guide.

TELOS, Pasco, in Ancient Geography, an island of the Archipelasgo, situated S.E. of the isle of Coa, and N.W. of that of Rhodes. Pliny says that it was celebrated for its perfumes.

TELPAH, in Geography, a town of Hindooftan, in Bahar; 40 miles S.S.W. of Patna.

TELPHUSA, in Ancient Geography, a town of the Peloponnesus, in Arcadia, upon an eminence, at some distance from the river Ladon, S.E. of Trachis. A temple of Ceres was situated near this town, in which she was honoured under the name of Lufia.

TELNUMNUM, a town of Aquitanic Gaul, on the route from Aosta Tarbellicus to Burdigala, between Ceyrosa and Salamacum. Anton. Itin. This is the same with Tellonum.

TELWARAH, in Geography, a town of Hindooftan, in Agimere; 25 miles N. of Buddakano.

TEMA, a town of Africa, in the kingdom of Ningo, on the Gold Coast.

TEMACHIS, in Natural History, the name of a genus of fossils, of the class of the gypfums; the characters of which are these: it is of a softer substance than many of the other genera, and of a very bright and glittering hue. The name is derived from the Greek τεμαχις, frutulum, a small irregular fragment; the bodies of this genus being composed of an assemblage of multitudes of irregular flaky fragments, as are all the gypfums; but no genus of them so visibly as these. Hill. See GYPSUM.

TEMALA, Negrais, in Ancient Geography, a maritime town of India, on the western coast beyond the Ganges, S. of Berahom, where the coast turns towards the E. at the W. mouth of the river Sabaracut.—Also, a river of India, the mouth of which was near Berahom, and the promontory of Temala.

TEMAN, in Commerce, the name of a dry measure at Mocha, in Arabia, containing 40 meccndras or keltas, and weighing in rice 168 lbs. averdupois.

TEMANIK, in Geography, a town of Persia, in the province of Kerman; 25 miles S. of Malibb.

TEMAPARANA, in Zoology, the name of a peculiar species of lizard, called also trygynac.

It approaches much to the nature of the iguana, but is black, spotted with white.

TEMA, in Geography, a province of the kingdom of Angola.

TEMBA, in Geography, a town of the island of Celebes. S. lat. 1° 27'. E. long. 110° 26'.

TEMBASA, in Ancient Geography, a celebrated town of Greece, in the Peloponnesus. Pliny.

TEMBEN, in Geography, a town of Abyssinia; 100 miles E.S.E. of Siré.

TENBLEQUE, a town of Spain, in New Gascly; 13 miles E.S.E. of Toledo.

TEMTRIPUUR, or TMBRIPUUR, in Ancient Geography, a town of Afa, in Phrygia.

TEMROGIUS, a river of Afa, in Phrygia, which ran into the Sangarius.

TEMBRUS, a town of the island of Cyprus.

TEMFUL, in Botany, a name used by some authors for the plant called betel.

TEMDE, in Geography, a river of England, which runs into the Severn, 2 miles above Ludlow.

TEMDEGUENIAMEN, a poft of Chinese Tartary; 10 miles S.E. of Tientsin.

TEMME, or TEAM, a river of England, which rises in the county of Radnor, and runs into the Severn, 2 miles below Worcester.

TEMEN, a town of Egypt, on the left bank of the Nile; 9 miles N. of Tanta.

TEMEN J£b£ng, a town of Egypt; 12 miles N. of Fayoum.

TENELET, a town of Morocco; 20 miles W.S.W. of Morocco.

TEMELO, in Ichthyology, a name used for some for the fish called in English the grilse, and in some places under the.

TEMEN, in Geography, a town of Arabia, in the province of Nedsjed; 80 miles S.S.E. of Jamama.

TEMENDEFUST, or METAFUST, a town of Algiers; 10 miles E. of Algiers.

TEMENEH, a town of Afa, in Asia Minor, in the confines of Lydia.

52 miles W.N.W. of Shob.

TEN, a town of the island of Candia; 6 miles S. of Candy.

TEMEN, Porta, in Ancient Geography, a small town of Asia Minor, in Lydia.

TENNELIA, a town of Afa, in Phrygia, on the confines of Lydia.

TEMENIUM, a fortress of the Peloponnesus, on the confines of the Argolid. Here were two temples, one dedicated to Neptune, and another to Venus.

TEMERICUS AGIR, a small country of Gallia Narbonensis, towards the source of the Rhine.

TEMES, in Geography, a river of Hungary, which rises
in the south-east part of the mountains, and runs into the Danube, opposite Belgrade.

TEMESA, in Ancient Geography, a town of Italy, in Bruttium, called Tempsa or Temia in the time of Strabo.

TEMECAMANG, in Geography, the principal of those lakes in Lower Canada formed by the Outawas and its contributory streams, which lake has always been a trading port, and which may be paid to continue, by a succession of rivers and lakes, upwards of 50 leagues from the Forks, passing near the waters of the lake Abibithy, in N. lat. 48° 30', which is received by the Moose river, that discharges itself into James bay. Mackenzie's Travels.

TEMESCH, a town of New Mexico, in the province of Mayo; 160 miles E.N.E. of Santa Cruz.

TEMESVAR, or TEMESVAR, a town of Hungary. This is an important fortress, situated on the river Beg, which forms a moras round it, and is strongly fortified. It is the capital of a bannat, the residence of a governor, and the seat of a Greek bishop. It was taken by prince Eugene in 1716; and by the peace of Paffarowitz was, with the whole bannat, confirmed to the house of Austria; since which time it has been almost wholly rebuilt. It is large and populous; the streets broad and well paved. The fortress is a castle with walls nine feet thick, and requires a garrison of 14,000 men. It contains about 443 square German miles, with a population of about 450,000 inhabitants; 52 miles E.N.E. of Belgrade. N. lat. 45° 40'. E. long. 21°.

TEMEN, in Commerce, a money of account in Algiers, equivalent to 2 carubes, or 20 aspers. See Coin.

TEMISCHBERG, in Geography, a fortress of Ruflia, in the government of Caucasus; 60 miles W. of Stavropol.

TEMISSEAH, or TEMISSA, a large town of Africa, in the province of Fezzan, distant from Mournzouk, its capital, in an E.N.E. direction, about 120 miles. Here the caravan of pilgrims from Bornou and Nigerat, which takes its departure from Mournzouk about the end of October, or beginning of November, and travels by the way of Cairo to Mecca, arrives in the evening of the seventh day, and usually provides thestores of corn and dates, and dried meat, that are requisite for its dry and pungent

TEMISVAR. See Bara.

TEMITZ, a town of Bohemia, in the circle of Chrudim; 18 miles N.W. of Ch rudim.

TEMLOWKA, a town of Algiers, anciently called "Sigus"; 24 miles S.E. of Constantina.

TEMMA, a town of Africa, on the Gold Coast. N. lat. 5° 45'. W. long. 0° 54'.

TEMMEISSUS, in Ancient Geography, a town of Asia, in Syria, on the route from Seleucia to Larissa, between Chaleida and Apanea. Anton. Itin.

TEMMES, in Geography, a town of Sweden, in the government of Uleia; 20 miles S. of Uleia.

TEMNIKOV, a town of Ruflia, in the government of Tambov; 116 miles N.N.E. of Tambov. N. lat. 54° 28'. E. long. 43° 3'.

TEMNOS, in Ancient Geography, a town of Asia Minor, in Ionia, at the mouth and north of the river Hermus. It did not subsist in the time of Pliny.

TEMNOEL, in Geography, a town on the west coast of the island of Celebes. S. lat. 0° 5'. E. long. 119° 35'.

TEMORIS, a town of New Mexico, in the province of Cuiiacaen; 70 miles N.N.E. of Cuiiacaen.

TEMOSOGHI, a town of New Mexico, in the province of Hiaqui; 130 miles E. of Riochico.

TEMPATLAHOAC, in Ornithology, the name of a broad-billed bird of the West Indies, described by Nieremberg; and by him allcemed a species of duck. It is a variety of the anas cygneta. See Duck.

It is of the size of the common duck; is common on the lakes of Mexico, and is a good eatable bird. Ray.

TEMPE, in Ancient Geography, a celebrated valley of Theffaly, between the mountains Olla and Olympus. Alca, Pliny, and Strabo reprefent it as 40 stadia in length, along the middle of which lay the course of the river Peneus, which separated Thessaly from Macedonia. Tempé, according to Livy, was the same given to the wood or forest, which, though not dangerous, was difficult for an army to pass, because of two defiles five miles in length; and the river Peneus made a terrifying noise in passing through this deep valley. Tempé, it is said, is derived from the Greek τημέριον; in the plural, signifying wood. Tempé, at its entrance, has a large village, which has been long famous for the accomplishments of its inhabitants, and for the great trade they carry on with Vienna and the interior of Europe. Tempé, in Commerce. See Stanpe.

TEMPELBURG, in Geography, a town of Hinder Pomerania; 19 miles W. of New Stettin. N. lat. 53° 29'. E. long. 16° 12'.

TEMPER, in a Physical Sense. See Man.

TEMPER, in a Physiologic Sense. See Temperament, in Music.

TEMPER, in a Mechanical Sense. See Tempering.

TEMPERAMENT, Temperamentum, Temperature, in Physiology. See Man.

TEMPERAMENT, Temperamentum, in Music, generally denotes a rectifying or amending of the falfe or imperfect concords, by transferring to them part of the beauty of the perfect ones.

The degrees of the octave, which may be called its elements, as being the smallest intervals into which it is resolvable, are two greater semitones, two less tones, and three greater tones.

Now the different situations of these elements, with respect to each other, occasions that intervals or concords of the same name, as thirds, fourths, &c. do not consist of the same degrees or elements, though there be always the same number of them; but one fourth, for instance, is agreeable and perfect, and another not.

To mend these imperfect concords, the musicians have bethought themselves to temper, i.e. give them part of the agreeableness of perfect ones. In order to this, they take a medium between the two, and this they call a temperament; which necessarily produces a new division of the octave, or, which amounts to the same, new elements.

For instance, whereas naturally its elements are the greater semitone, and the greater and less tone; they take a middle tone formed of the greater and the less; and the only elements now are the greater semitone, and this mean tone, which renders the five intervals that are tones equal, and those that are semitones less unequal to these.

One might also divide each of the five tones of the octave into semitones, which, joined to the two it naturally has, would make twelve: in which case, the whole octave would be divided into twelve equal parts, which would be mean semitones.

It is easy to form various other kinds of temperaments: all the difficulty is to find such as are free from two great inconveniences, i.e. which do not alter either all the concords too much, or, at least, some of them.

All such divisions of the octave are called tempered or temperate systems.

The temperament does, indeed, according to the definition given above, considered in one view, correct some false concords,
conords, yet, in other respects, it spoils and falsifies both perfect and imperfect concords, and renders discords more harsh than they would otherwise be, if the intervals were justly taken. To explain this, we must consider that all the intervals are founded on the primary proportions arising from the numbers 2, 3, and 5; that is, if we do not exceed the compass of an octave, $\frac{3}{2}$, 3, and 5. See INTERVAL.

The nearer we come in practice to the true intervals, the more perfect the melody and harmony will be; and it is certain, that the human voice, and some instruments, as violins, &c. which have no flats or sharps, will execute music to a great degree of exactness; but the ear is not the same with fixed or fretted instruments, as harpsichords, organs, lutae, viol, &c. Accuracy is here impossible, unless we would content ourselves with always playing in the same key, without any transition or transposition whatsoever. In this case, indeed, the harpsichord or organ might vie with the accuracy of the voice or violin. For instance: if we were to compose or play in the key of C, then we might make the several intervals of that key to be in the following true proportions, \(1, \frac{5}{4}, \frac{8}{5}, \frac{5}{3}, \frac{8}{5}, \frac{4}{3}, \frac{7}{4}, \frac{5}{4} \), that is, in whole numbers, \{C D E F G A B C\} and the instrument tuned in this manner, would perform any piece of music in C, justly composed, with great beauty and exactness; taking for granted, that every key, fundamental note, or found, ought to have its true fifth and fourth, and that these ought also to have their true fifths and thirds.

Now this being premised, it will presently appear, that in making any transposition or transition from C, we shall find some false concord. Thus, for instance, if we proceed to G, and consider it as a key, or fundamental found, we shall have the following series of numbers for the octave of G, viz. \{G A B C D E F G\}

But here the interval between 40 and 54 is false, being a comma too much, for the second of a key mall make a true fifth with the fifth of the same key. In like manner, if we were to proceed from C to A, as a new key, we should find the following series for the octave of A, \{A B C D E F G\}, where the interval between 40 and its fourth D 54 is false, being too great by a comma. If any other transition were examined, we shall always find some false note; as in F, the fifth would be redundant by a comma; and in D, the fifth would be deficient by a comma. All which shews the impossibility of truth and exactness of music on fixed instruments. Yet as these instruments have their use and convenience in some respects, it was proper to endeavour to find out a method of making them tolerable. It has been observed under the article INTERVAL, that the tone major exceeds the tone minor by a comma. Their difference is necessary for the truth and perfection of music; but yet if these tones were rendered equal, the ear would not be offended. And this has suggested the means of tempering fixed instruments. If we were to make all tones equal to the tone major, as some imagine the ancients did, then we should find the ditonus, or third, exceeding a true third major by one comma, which would be intolerable. In like manner, if all tones were to be minor, we should have thirds much defective by a comma, which would also be intolerable, not to mention other false intervals that must necessarily arise from such a supposition.

Supposing then one tone increased, and the others diminished by half a comma, we should have our thirds major remain perfect. But still it would be necessary to examine what fifths this supposition would give. Now it is evident that a tone major added to an octave, makes just two fifths, thus \(\frac{5}{4} \times \frac{5}{4} = \frac{25}{16} = \frac{5}{4} \times \frac{5}{4}\). But the tone here added is a tone major, and the tone we have assumed is a temperate tone deficient from the tone major by half a comma; hence the sum of the two fifths, on this supposition, will fall short of the truth by half a comma, and consequently one fifth will be deficient a quarter of a comma. Which difference, although it be tolerable, yet experience shows, that fifths so diminished are tolerable.

This temperament is what is called the common or vulgar temperament, and confuses, as has been said, in diminishing the fifth by a quarter of a comma, in preferring the third major perfect, and dividing it into two equal tones. Which being supposed, it follows that the fourth must exceed the truth by a quarter of a comma; that the third minor will be deficient by the same quantity; that the sixth major will be perfect, and the sixth major redundant by a quarter of a comma; and lastly, that the semitone major will exceed the truth by a quarter of a comma, and consequently the difference between the two semitones, or the diatonic enharmonics, will be preferred.

If then we had a harpsichord or organ, with each feint or half note divided, we should have the following notes or founds, viz. C C*, Cb, D, D#, Eb, E, F, G, G*, A, A#, Bb, B, c, in the compass of an octave. Yet this system of notes, numerous as they seem, would not be sufficient for all transitions and transpositions. For though a piece of music transposed to any of the natural keys, C, D, E, F, G, A, B, and to the flats, as Eb and Bb, and some others, would do well; yet, in transposing to sharps, as to G*, we should not find a true third major, unless we introduced E*. And even in flats, as A# and Eb, we should not find a true third major in descending, or a sixth minor in ascending, which we introduced Fb and Cb. And in like manner, transpositions to G* and Eb would oblige us to introduce B* and Cb. Nor would even this suffice, for if necessity required a transposition from the key of C to that of D*, we should not find a true third major without introducing F** and c. So that at last we shall come to a temperate system, where, in ascending, the notes C, D, F, G, A, would each have its sharp and double sharp, and the notes B and E, each a single sharp. In descending, the notes E, D, B, A, G, would each have their flat and double flat, and the notes F and C each a single flat. And thus the octave would be divided into 32 intervals, whose designations are C D b B C* D* E b b D* E b D** E F b E* F G b b F* G b F** G E F b E* F G b b F* G b F** G A b b G* a b b G* a b b G** a b b A B b b A* B b A* B b a 21 22 23 24 25 26 27 A** b C b* C. Where the letters C, D, E, F, G, A, B, signify the common diatonic notes: those marked with a single ** or * are the chromatic; and those marked with a double *** or ** are the diatonic notes: so called, because the interval between them and the next diatonic note is an enharmonic diatonic; for which reason, the notes E*, F*, and B*, C** are also enharmonic.

But even in this division of the octave, all the notes would not have a third major in ascending and descending; thus, for instance, D** has no third major; for this would be F***, which is not in the scale, nor can any number of additional notes suffice in all cases. But this inconvenience is easily remedied, and the system considerably improved, by making all the thirty-one intervals equal. We have already observed, that in the
The common temperament, the sennatones major and minor exceeded the truth by a quarter of a comma, and that the enharmonic comma differs is preferred true. Hence it follows, that the hyperboch, or difference between the chromatic and enharmonic commas; for example, the interval between $F_b$ and $E_x$, or $D_b$ and $C$, will also exceed the truth by a quarter of a comma. Now the hyperbore, by our table under 

\[ \text{ Interval } = 1.79992 \text{ comma} \]

hence, the fifth, being 18 commas, will be 32.399 commas. Now the true fifths being 32.640, the fifth consequently in this temperament is deficient by 0.241 parts of a comma, which is less than a quarter of a comma by $\frac{1}{7}$ part; and therefore this fifth will, strictly speaking, be better than that of the vulgar temperament by $\frac{1}{7}$ of a comma; but this is insensible. Next, proceeding to examine the third, we shall find it equal to 10 commas or divisions, that is, 17.999 commas; and the true third major being 17.963 commas, the difference is 0.036, that is, about $\frac{1}{7}$ of a comma. Now as the ear can bear a fifth, altered by a quarter of a comma, it will much more easily bear the alteration of $\frac{1}{7}$ of a comma in a third major. Again, in this temperament the third minor is indeed, strictly speaking, worse than in the vulgar, which differs from the truth but a quarter of a comma, whereas here it differs by about $\frac{1}{7}$ of a comma more; but then this difference is insensible.

Thus we have been led from the consideration of the vulgar temperament, to the invention of the temperament which divides the octave into 31 equal intervals, commonly called Huygens's temperament. This great mathematician was, indeed, the first who gave a distinct account of it, and heeded its use and accuracy. But here, as in many other inventions, we find the hint of the thing much older than the true knowledge of it. See Huygeni Opera omnia, vol. i. p. 748, 749, edit. 1. Lugd. Batav. 1724.

The division of the octave into 31 parts was invented in Italy about 300 years ago, by Don Nicola Vincentino. The title of his book is "L'Antica Musica Riddotta alla Moderna Pratica, &c." Roma, 1555, fol.; and an instrument, called archicembalo, was made upon this scheme, as Salinas informs us, who at the same time condemns it, as very disagreeable in practice. But this could be owing to nothing but its not being tuned according to the intention of the inventor. For if all the thirds major of this instrument were made perfect, and the fifths diminished by a quarter of a comma, it is evident that the instrument would be equally exact with any tuned according to the vulgar temperament, and would suffice for transpositions to any diatonic or chromatic notes, though not to all the enharmonic, as $D_x$ &c., because we should not find its third major. And if the instrument were tuned according to M. Huygens's scheme, of making all the divisions equal, it would then have all the 31 keys equally good, and very near the truth. See Salinas, lib. iii. The title of his work is "Francisci Salinas Burgensis de Musica Libri Septem," Salmantica, 1577, fol. Merennus's work is intitled "Harmonicon, Libri XII."

The second column of this table contains the numbers expressing the length of chords making 31 equal divisions, the longest, answering to C, being supposed to be divided into 100,000 parts.

In the third column are the syllables by which the notes are usually named in France; and the afterife * shews some enharmonic notes, of which that near fo $\frac{1}{7}$ is most necessary.

In the fourth column are the letters commonly used to denote the found of the octave.
The numbers of the second column were found by means of those in the first, which are their respective logarithms; and these were found by dividing $0.30102995560$, the logarithm of $2$, by $31$. The quotient $0.000006450$ is marked $N$, and being continually added to the logarithm of $10000$, that is, to $4.6987000000$, gives all the logarithms of the first column to the greatest $4.9999999993$, which being extremely near $5.0000000000$, the logarithm of $10000$, the operation has been rightly performed.

The fifth column gives the lengths of the chords in the common temperament; and this column contains their respective logarithms. Vide Huygenii Opera, vol. i. p. 752, 753.

The learned author of this temperament has not given the notes answering to all the divisions of the octave; but that may easily be supplied from what has been said above when we derived this temperament from the consideration of the common.

As Huygens has not given the names of all the intervals that occur in his temperate scale, we shall here insert them in the octave, from C to C, with their respective measures in the commas, and tenths of a comma.

<table>
<thead>
<tr>
<th>Intervals</th>
<th>Names</th>
<th>Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Db</td>
<td>Diminished second, extreme flat second, or enharmonic diatessaron</td>
<td>1.8</td>
</tr>
<tr>
<td>C</td>
<td>Semitono minor, or chromatic diatessaron</td>
<td>2.6</td>
</tr>
<tr>
<td>Db</td>
<td>Flat second, or semitone major</td>
<td>3.4</td>
</tr>
<tr>
<td>C#</td>
<td>Double semitone minor</td>
<td>4.2</td>
</tr>
<tr>
<td>D</td>
<td>Second, or tone</td>
<td>5.0</td>
</tr>
<tr>
<td>Eb</td>
<td>Diminished third, or extreme flat third</td>
<td>10.8</td>
</tr>
<tr>
<td>D#</td>
<td>Superfluous second</td>
<td>12.6</td>
</tr>
<tr>
<td>Eb</td>
<td>Third minor, or flat third</td>
<td>14.4</td>
</tr>
<tr>
<td>D##</td>
<td>Extreme superfluous second</td>
<td>16.2</td>
</tr>
<tr>
<td>E</td>
<td>Third major, or sharp third</td>
<td>18.0</td>
</tr>
<tr>
<td>Fb</td>
<td>Diminished fourth</td>
<td>19.8</td>
</tr>
<tr>
<td>Ex</td>
<td>Superfluous third</td>
<td>21.6</td>
</tr>
<tr>
<td>F</td>
<td>Fourth</td>
<td>23.4</td>
</tr>
<tr>
<td>Gb</td>
<td>Extreme diminished fifth</td>
<td>25.2</td>
</tr>
<tr>
<td>F#</td>
<td>Fifth, or semidiatessaron</td>
<td>27.0</td>
</tr>
<tr>
<td>G</td>
<td>Sixth, or semitessaron</td>
<td>28.8</td>
</tr>
<tr>
<td>G##</td>
<td>Extreme superfluous fourth</td>
<td>30.6</td>
</tr>
<tr>
<td>G</td>
<td>Fifth</td>
<td>32.4</td>
</tr>
<tr>
<td>Abb</td>
<td>Diminished fifth, or extreme flat fifth</td>
<td>36.2</td>
</tr>
<tr>
<td>G#</td>
<td>Superfluous fifth</td>
<td>36.0</td>
</tr>
<tr>
<td>Ab</td>
<td>Flat fifth, or fifth minor</td>
<td>37.8</td>
</tr>
<tr>
<td>G##</td>
<td>Extreme superfluous fifth</td>
<td>39.6</td>
</tr>
<tr>
<td>A</td>
<td>Sharp fifth, or fifth major</td>
<td>41.4</td>
</tr>
<tr>
<td>Bbb</td>
<td>Diminished seventh, or extreme flat seventh</td>
<td>43.2</td>
</tr>
<tr>
<td>A#</td>
<td>Superfluous seventh</td>
<td>45.0</td>
</tr>
<tr>
<td>Bb</td>
<td>Flat seventh, or seventh minor</td>
<td>46.8</td>
</tr>
<tr>
<td>A##</td>
<td>Extreme superfluous seventh</td>
<td>48.6</td>
</tr>
<tr>
<td>B</td>
<td>Sharp seventh, or seventh major</td>
<td>50.4</td>
</tr>
<tr>
<td>eb</td>
<td>Diminished octave</td>
<td>52.2</td>
</tr>
<tr>
<td>B#</td>
<td>Superfluous seventh</td>
<td>54.0</td>
</tr>
<tr>
<td>c</td>
<td>Perfect octave</td>
<td>55.8</td>
</tr>
</tbody>
</table>

The temperate diatessaron enharmonica of Huygens being 1.8 commas nearly, which is easily remembered, the measure of any interval in the octave may be found by multiplying it by the number denoting the place of that interval. Thus the sixth minor, being the twenty-sixth interval, will be $1.8 \times 26 = 46.8$. The octave, being the thirty-first, will be $31 \times 1.8 = 55.8$, which does not differ from the truth by more than 0.00237, that is, by $\frac{1}{440}$ of a comma, and therefore perfectly inedible. See INTERVAL.

All the intervals in the foregoing table, either have received names, or at least might receive them, from a perfect analogy to the names in use among practical musicians; but many of these intervals are as yet unheard of among practitioners. Perhaps, if all the genera of ancient music were restored, every interval here mentioned might be of use, either in melody or harmony, and thereby greatly add to the variety of composition.

We have already mentioned the advantages of M. Huygens's system; but its excellency will better appear by comparing it with the schemes of others. We may distinguish and name the different temperaments by the number of equal parts into which the octave is supposed to be divided. The temperaments that occur in books are temperaments of 12, 19, 31, 43, 50, 53, and 55 parts, of which in order.

The temperament of 12 parts is founded on the supposition that the semitones major and minor may be made equal. Hence the octave will be divided into 12 equal semitones, seven of which will make the 5th, four the 3d, and three the 3d minor.

The temperament of 19 parts goes upon the supposition that the semitone major is the double of the semitone minor. Hence the tone will be 3, and the third major 6. The diatessaron enharmonica will be 1, 1 and consequently the octave, being three thirds major and a diatessaron, will be 19. The fifth contains 11 parts. The harpsichord, in this scheme, will have every fret cut in two, one for the sharp of the lower note, and the other for the flat of the higher. Between B and C, and between E and F, will be interspersed keys, which must serve for the sharps of B and E, and the flats of C and F respectively.

The temperament of 31 parts is M. Huygens's, already described; here the semitones are as 3 to 2. The third major is 10, and the fifth 18.

The temperament of 43 is M. Sauveur's, and by him very fully described in the Memoirs of the Royal Academy of Sciences, A.D. 1701, 1702. He supposes the proportion of the semitones to be as 4 to 3. Hence his tone is 7, the third major 14, the fifth 25, and the octave 43. What musical foundation this learned gentleman went upon in the investigation of this temperament, is not known: but it seems liable to insuperable difficulties; for here the diatessaron enharmonica is but the half of the difference between it and the chromatic diatessaron: whereas, in truth, this difference, instead of being double of, is really less than the enharmonic diatessaron, as was long ago objected to him by Mr. Henfling, and appears from the table under INTERVAL. Michael, Berolim, tom. i. p. 285, 286.

Besides, his enharmonic diatessaron falls greatly short of the truth, being but 1.27 of a comma, which is an error of 0.64, or nearly $\frac{1}{4}$ of a comma. Whereas, in M. Huygens's temperament, the error of the diatessaron is almost inedible, being but $\frac{1}{640}$ of a comma. Nor are the practical advantages of M. Sauveur's system any ways comparable to Huygens's.

His fifth is indeed, strictly speaking, better; but so little, that the difference is not inedible, not being $\frac{1}{440}$ of a comma. On the other hand, his thirds are sensibly worse, the major

Vol. XXXV.
TEMPERAMENT.

being \( \frac{3}{4} \), and the minor \( \frac{5}{8} \) of a comma false. Whereas Huygens's third major does not differ sensibly from the truth, and the minor has no sensible difference from the third minor deficient by \( \frac{5}{4} \) of a comma of the common temperament, which ought to be deemed the limit of the diminution of concords. If we add to this, that the much greater number of parts in M. Sauveur's octave, makes it much more intricate than M. Huygens's, and that these parts would be false or useless, even supposing the enharmonic genus restored, no musician will long hesitate which he ought to prefer.

The temperament of 50 parts is proposed by Mr. Henfling in the Miscellanea. Berolin. above cited: he takes the proportion of the semitone as \( 5 : 3 \); here his tone is 8, the third major 16, the fifth 29, and the octave 50. The third major and fifth in this system will be worse than Huygens's, though the third minor be a little better. The third major is here less than the true, and the fifth deficient by more than \( \frac{5}{8} \) of a comma, which is a fault, not to mention the inconvenience arising from dividing the octave into 50 parts; besides, \( 5 : 3 \), the proportion of the semitones here assumed, although expressed in greater numbers, is not so near the truth as M. Huygens's of \( 3 : 2 \). See RATIO.

The temperament of 53 parts is mentioned by Merfennus. Here the tones will be unequal, 9 being the tone major, and 8 the minor. Hence the third major will be 17, and the fifth 34, which last does not differ from the truth by above \( \frac{1}{17} \) part of a comma. The third minor is also more perfect than in M. Huygens's system. But the multiplicity of parts in the octave of this system renders it too intricate; and the distinction of tones major and minor upon fixed instruments is impracticable.

The last temperament we have to mention is that of 55 parts, which M. Sauveur calls the temperament of practical musicians. Its foundation lies in assuming the proportion of the semitones as \( 5 : 4 \); so that the tone will be 9, the third 18, and the fifth 32. The fifth in this system, as in that which makes the semitones equal, is nearer the truth than M. Huygens's, but this advantage is not \( \frac{1}{5} \) of a comma; and on the other hand, the thirds, both major and minor, are here greatly mutilated, as will appear by the annexed table, exhibiting the thirds and fifths of these several temperaments, as also the thirds and fifths of the common temperament, and two mentioned by Salinas, marked 1st, Salin, 2d. Salin. The letter V. stands for the fifth; III. for the third major; and 3 for the third minor. The fifths are all deficient, but the thirds are sometimes less than the true; the first are marked +, the others -.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Of 12 parts</td>
<td>32.549</td>
<td>0.091</td>
<td>18.599</td>
<td>0.636</td>
<td>12.950</td>
<td>0.727</td>
</tr>
<tr>
<td>19</td>
<td>32.304</td>
<td>0.336</td>
<td>17.620</td>
<td>0.343</td>
<td>14.684</td>
<td>0.004</td>
</tr>
<tr>
<td>31</td>
<td>32.399</td>
<td>0.421</td>
<td>17.999</td>
<td>0.346</td>
<td>14.400</td>
<td>0.277</td>
</tr>
<tr>
<td>50</td>
<td>32.440</td>
<td>0.200</td>
<td>18.167</td>
<td>0.204</td>
<td>14.273</td>
<td>0.404</td>
</tr>
<tr>
<td>53</td>
<td>32.375</td>
<td>0.037</td>
<td>18.857</td>
<td>0.108</td>
<td>14.508</td>
<td>0.160</td>
</tr>
<tr>
<td>55</td>
<td>32.637</td>
<td>0.000</td>
<td>18.261</td>
<td>0.066</td>
<td>14.740</td>
<td>0.063</td>
</tr>
<tr>
<td>Com. Temp.</td>
<td>32.390</td>
<td>0.250</td>
<td>17.963</td>
<td>0.000</td>
<td>14.203</td>
<td>0.474</td>
</tr>
<tr>
<td>1st Salin.</td>
<td>32.307</td>
<td>0.333</td>
<td>17.630</td>
<td>0.333</td>
<td>14.427</td>
<td>0.250</td>
</tr>
<tr>
<td>2d Salin.</td>
<td>32.354</td>
<td>0.286</td>
<td>17.520</td>
<td>0.143</td>
<td>14.434</td>
<td>0.143</td>
</tr>
<tr>
<td>True Scale.</td>
<td>32.640</td>
<td>0.000</td>
<td>17.063</td>
<td>0.000</td>
<td>14.607</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Temperaments formed by the division of the octave into equal parts, may be called geometrical temperaments. The common, and the two mentioned by Salinas, do not proceed upon this foundation; the intention of the first inventors not having been to make transpositions to every note of the system equally good; but only to make the most usual transistions in the course of a piece of music tolerable. Hence the parts of the octave, in their supposition, were not all equal.

The common temperament, as we have said, prefers the third major perfect. The first of Salinas prefers the third minor perfect. In the second of Salinas, the femitone minor is perfect. The foundation of his first temperament is making the temperate tone equal to the tone minor and \( \frac{3}{4} \) of a comma, or the tone major less \( \frac{3}{4} \) of a comma. Hence his fifth and third major will be deficient by \( \frac{3}{4} \) of a comma; and the third minor consequently will be true. The ground of his second scheme is, to add \( \frac{3}{4} \) of a comma to the tone minor, or take \( \frac{3}{4} \) from the tone major for his temperate tone. Hence the fifth will be deficient by \( \frac{3}{4} \) of a comma, and the thirds major and minor each deficient by \( \frac{3}{4} \) of a comma. Consequently, the femitone, being their difference, will be preferred.

As to Mr. Salmon's scale in the Philosophical Transactions, there is nothing true in it, but the diatonic scale of C. His scale for A is false, the fourth being erroneous by a comma: most of his semitones are likewise false. 'In short, it can neither be considered as a true scale, nor as a temperament.

Before we close this article, it may be proper to add a few words about the method of invention of the foregoing geometrical temperaments. M. Huygens having had the hint of a division of the octave into 31 parts, had nothing farther to do but to examine it by logarithms. But supposing no such hint had been given, he might have investigated it directly, by the method laid down by himself, and also by Dr. Wallis and Mr. Cotes, for approximating to the value of given ratios in smaller numbers. We have given Mr. Cotes's method under RATIO. The application of that method to the present purpose is thus: the ratio of the octave to the third major is 55.79763 to 17.96282, and the approximating ratios will be,

1. Greater than the true 28 : 9, 87 : 28, &c.
2. Less than the true 3 : 1, 31 : 10, 59 : 19, 205 : 66, &c.

The ratios greater than the true must all be rejected; because they give the third major less than true, and consequently the tone (its half) deficient by above \( \frac{3}{4} \) of a comma; which gives the fifth deficient above \( \frac{3}{4} \) of a comma; but this ought not to be. The first of the ratios less than true is 3 : 1, or 12 : 4, which is the temperament of 12 parts before described, and too inaccurate. The next is 31 : 10, or M. Huygens's. The rect divide the octave into too many parts.

The fame may be also found thus: the ratio of the octave to
to the common temperate fifth, deficient by 4 of a comma, is
\[56:79:63 \text{ to } 32:38:952\]. The approximating ratios to which are

2. Less than the true \[2 : 1 : 3 : 2, 5 : 3, 12 : 7, 31 : 18, 205 : 119\]. Where we have the temperaments of 12, 19, 31, and 50 parts, before examined.

And here all ratios greater than the true ought to be rejected, because they give the fifth less than true, that is, in this case, deficient by more than \(\varphi\) of a comma.

If we investigate the approximating ratios to the ratio of the semitones major and minor, or \(5.19529\) to \(3.28612\), we shall have the ratios \(1 : 1, 2 : 1, 2 : 5, 3 : 2\), which respectively give the temperaments of 12, 19, 31, and 50 parts, before described.

Again, investigating the approximating ratios of the fifth to the third major, we shall find \(7 : 4, 9 : 5, 11 : 6, 29 : 16\), which will also give the temperaments 12, 19, 31, 50, as before.

Lastly, the approximated ratios of the octave to the true fifth are \(12 : 7\) and \(53 : 31\) greater than the true; the others being of no use, since the fifth must necessarily be diminished.

Here we find the temperament of 53 parts. As to the temperaments of 42 and 55, being detritus of any musical foundation, it is no wonder they do not appear by this method of investigation.

M. Huygens, in his Cosmoteoros, says that the tone or pitch of the voice cannot be preferred, unless the consonants be tempered, so as to deviate a little from the highest perfection. For the proof of this assertion, he brings a melody consisting of the following sounds, C, F, D, G, C; where, if the intervals were to be sung perfect, by taking the interval from C to F a true fourth ascending, from F to D a third minor descending, from D to G a true fourth ascending, and lastly, from G to C a true fifth descending, we shall find a comma below the C from whence we began. Therefore, if we were to repeat this series of notes nine times, we should at last fall near a tone major below our first found.

M. Huygens's solution of this difficulty is, that we remember the note from whence we set out, and return to it by a seoret temperament, thereby singeing the intervals a little imperfect; which, he says, will be found necessary in almost all songs or melodies.

A like difficulty is mentioned in the Memoirs of the Royal Academy of Sciences; and there urged for the necessity of a temperament, even for singeing in the same key. And M. Huygens's solution of the difficulty is there approved of. Ann. 1707, p. 264.

But the solution of these learned gentlemen is, as yet, far from being decisive. No experiment has yet been brought to shew that the human voice singer tempered notes; not even when accompanied by tempered instruments. It seems to us, on the contrary, that an excercised voice, guided by a good ear, sings true, even though accompanied by a mistuned instrument, as harpsichords most frequently are, especially in transposed keys. And were these instruments always as well tuned as art could make them, yet their tones would be equal; and it seems evident to the ear, that the human voice singing naturally two tones in succession, as C, D, E, never makes them equal; and cannot, without great difficulty, and by means of a variation of harmony, be brought to make them equal.

Another solution, therefore, of M. Huygens's difficulty, must be sought for. The truth seems to be, that the second of the key must be the true tone major above the key and therefore the third between the second and fourth of the

key must be sung deficient by a comma. Thus in the key of C, from C to D will be a tone major = \(\varphi\), and from D to E' will be a deficient third = \(\varphi\). See INTERVAL.

M. Huygens's melody, therefore, will stand as follows:

\[
\begin{align*}
\text{C} & \text{F} & \text{D} & \text{G} & \text{C} \\
\frac{4}{\varphi} & \frac{5}{\varphi} & \frac{3}{\varphi} & \frac{2}{\varphi} & \frac{1}{\varphi}
\end{align*}
\]

And the voice would sing the interval F, E, just as if the note E' had been interpolated; in which case the notes would be

\[
\begin{align*}
\text{C} & \text{F} & \text{E} & \text{D} & \text{G} & \text{C} \\
\frac{4}{\varphi} & \frac{5}{\varphi} & \frac{6}{\varphi} & \frac{3}{\varphi} & \frac{2}{\varphi} & \frac{1}{\varphi}
\end{align*}
\]

These notes all come within the diatonic scale of C; and the voice naturally falls upon the note from whence it set out. The same answer will hold in the example mentioned in the Memoirs of the Academy of Sciences; where the intervals bB, G, E, C occur. And here the interval from bB to G should be taken = \(\frac{2}{\varphi} = \frac{5}{\varphi} + \frac{2}{\varphi}\), as in the former example; and for the same reason, the key being F.

There seems, therefore, no repugnancy between the practice and theory of music, while the melody is confused to one key; but it must be owned, that in transitions from key to key, especially where several parts are to make harmony with each other, there will remain difficulties, not mentioned by M. Huygens, or any other writer we know of, which might deserve a farther examination.

We must not omit mentioning, that the learned Dr. Smith, in his Harmonics, has not only carried the theory of temperaments far beyond all the authors that preceded him; but has shewn how to tune an instrument according to any proposed temperament, by the ear only, which is certainly a most ingenious discovery.

This learned author prefers what he calls the temperament of equal harmony, which differs insensibly from: the division of the octave into fifty parts, to all others; and infalls, that it labours under the fewest defects, and is of all others the most agreeable in practice. In the system of equal harmony, the temperaments of the fifth, third major and third minor, are respectively \(\frac{2}{\varphi}\) and \(\frac{4}{\varphi}\) and \(\frac{2}{\varphi}\) of a comma less than the truth.

It would be impossible here to do justice to the learned author’s reasons on this subject; we shall only add, that he collaborated, contrary to the common opinion, that the least simple consonances, generally speaking, will not bear so great temperaments as the simpler consonances.

Dr. Smith mentions a temperament communicated to him by the ingenious Mr. Harrington, which consists in making the proportion between the octave and third major equal to that of the circumference of a circle to its diameter. In this temperament the third major is diminished by \(\frac{2}{\varphi}\) of a comma, but the third minor is very near the truth, and extremely beautiful.

A late author seems to think the division of the octave into thirty-one parts, not to be of modern invention, but necessarily implied in the doctrine of the ancients. At first sight, it would seem as if the ancients made but twenty-four dieses or divisions in the octave, viz. ten to each fourth, and four to the tone; which (the octave being equal to two fourths and a tone) gives twenty-four dieses to the octave. But the author just quoted contends, that this division is to be understood only in one tenon, that is, either ascending or descending; but that, accurately speaking, if we consider all the dieses, or divisions of the fourth, both ascending and descending, we shall find thirteen; five to each tone, and three to the semitone major; and consequently thirty-one divisions in the octave. These, indeed, are not all naturally equal; but if we make them so, we shall...
shall have a temperament known by the moderns under the
name of Huygens's temperament. Dr. Pepusch, in Phil.
Trans. N° 481. p. 273. See the article DIEMS.

Such was the history and theory of temperament about
half a century ago. But as our keyed and wind instruments
have extended their compass and players, and all the ancient
laws of relative modulation are disregarded by modern com-
posers, most practical musicians incline to equal hierarchy,
in which all the keys participate of the impression of the
scale: when the octave is divided into twelve semitones, of
which every one occasionally serves for two or three dif-
ferrant purposes. As the note A natural, for instance, is
sometimes B double-flat, and sometimes C double-sharp,
E natural is obliged to designate D double-sharp, and some-
times F flat.

There are, however, theorists who calculate, but never
listen, and who think temperament an abomination, a deadly
sin, against Pythagoras and his triple progression. Now as
it is generally agreed that the ancients had no simultaneous
harmony, or music in parts, and allowed of no consonances
but the unison, octave, 4th, and 5th, they did wisely to
make them as perfect as possible; but since the invention
of counterpoint, and new instruments of fixed tones by
keys, frets, and additional ventages, which furnish us
twelve semitones, whereas thirty-one different sounds are
wanted to furnish two distinct sounds for synonomous notes,
such as $A$ and $B b$, $C$ and $D b$, $D$ and $E b$, &c., temper-
ament, though it a little diminishes the perfection of certain
notes, the whole instrument is bettered by it, and rendered
equally fit for all keys. Every concord, except the unison
and octave, has a latitude, and allows of bearings without
offending the ear. A perfect 5th makes an intolerable
major $3 d$ below it. And as the $3 d$, though called an
imperfect concord, is the most grateful and pleasing of all
the concords when perfect; contrapuntists do wisely to
allow tuners to rob 4ths and 5ths of a little of that per-
fection which they can spare without injury, for the good of
the whole. If the learned harmonist, the abbé Rouilier, is
living, this relaxation of Pythagorean discipline, and want
of due respect for the triple progression, will, we fear, disturb
and render him somewhat intertemperate in confounding our
affarday.

We have always regarded music as an object for the ear,
and wish to make it as pleasing to that sense as possible; and
have been so long accustomed to tempered scales, as to re-
ceive more pain than pleasure from music performed on an
instruments tuned by perfect 5ths throughout, that is, by
the triple progression. We shall, however, prescribe no ex-
clusive method of tempering the scale; as almost every
man who tunes his own instrument has a system of his own; we
shall only observe, that the greatest musicians in the
course of their lives have often changed their method.
In our cathedrals and parish-churches in general, where the
natural keys are made as perfect as possible, at the expense
of $A b$, $D b$, $F s$, and $C s$, keys that have never been admitted
within the pale of the church, organists that hear little
other music, are extremely offended by equal partici-
pation of the scales, when the pure harmony of their
favourite keys is deformed by temperament; and those ac-
customed to the levelling system of equal hierarchy, on the
contrary, hold the wolf as much abhorrence, as they
would the destructive wolf in the Gevand. At present,
our tuners mitigate the extremes of equal and unequal
temperament, by favouring the natural keys, and making
the extraneous or transposed keys somewhat less perfect;
but devoting the wolf to total destruction.

It is imagined by many, that the character of keys, par-
ticularly the minor, depends on the impression of the
scales, occasioned by unequal temperament: as F minor is
plain, $E b$ sombre, and $E s$ brilliant. But though the
difference between the pitch of $E b$ and $E s$, $D s$ and $E b$,
is but half a note, whatever may be the general pitch of the
instruments, whether half a note too high, or half a note too
low, these keys still retain their character, it should seem
not from the tuning or elevation of the general system, but
from something for which we are unable to account. See
Music, and Sound.

TEMPERATE ZONE. See ZONE.

TEMPERATURE, in general, denotes the degree of
free caloric which a body appears to possess when com-
pared with other bodies; or, in other words, the state of a
body in relation to its capability of producing in other
bodies the effects arising from the presence of free caloric.
Sir Humphrey Davy defines temperature to be "the
power bodies possess of communicating or receiving heat,
or the energy of repulsion." But this definition appears
to us to be a little ambiguous, for temperature is not a
term indicative of a positive faculty in bodies, as this defi-

There are two means of measuring the temperature of
bodies, namely, by our sensations, or by the different degrees
of expansion produced in bodies on being subjected to dif-
ferent degrees of free caloric. The first of these, from
various obvious causes, is so imperfect and limited, that no
dependence can be placed upon it as a measure of tem-
perature. The second is much more regular and extensive, and
is, therefore, always at present employed. "When
two bodies produce the same increase or diminution of
volume in a third body, to which they are equally applied,
they are said to be of the same temperature; and any body
is said to be at a higher or lower temperature, as it produces
a greater or less expansion in another body with which it is
in contact." Inflammations founded upon the principle of
the expansion of bodies by heat, and defined to measure
degrees of temperature, are called thermometers, or, when
the temperature is very high, pyrometers; which see.

The same heads also the important question is dis-
cussed, how far the expansion of bodies by heat is to be
considered as an indication of their real temperature. See
also CALORIC.

TEMPERATURE of the Atmosphere. See ATMOSPHERE.

TEMPERATURE of Climate. See CLIMATE.

TEMPERATURE of the Earth, is that degree of sen-ible
heat which exists on the surface, or in the interior of the
solid part of the globe. The temperature of the atmo-
sphere is frequently described as the same with the tem-
perature of the earth, from which it is essentially diffi-

The sensible heat of the atmosphere varies with the latitude,
the season, and the elevation of the place in which the obser-
vation is made. The superficial temperature of the earth varies
also with the latitude and the season, and in a still greater
degree if the land be dry; but the internal temperature of the
earth appears to be permanent in each place throughout
the whole year. At a certain depth under the surface, the
thermometer always indicates the same degree of heat; and
the difference between the permanent internal temperature
in different latitudes, is much less than that which exists at
the surface. The depth at which the thermometer remains
stationery about latitude $52^\circ$, is 80 feet; nearer to the
equator,
TEMPERATURE.

equator, or the poles, a greater depth would be necessary to obtain the permanent temperature. At still greater depths, probably, the temperature under each degree of latitude is the same all over the globe, except in the vicinity of volcanic fires.

M. Volney, in his travels through North America, speaking of the temperature of the earth, endeavours to oppose the opinion of its permanent internal temperature. Setting out from Lake Superior, he says, and proceeding well to the Stoney mountains, and travelling north as far as latitude 72°, the country now well known to the Canadian traveller, displays a climate that for severity of cold can be compared only to Siberia. From latitude 46°, the earth is frozen during the whole year. At several trading posts between latitude 50° and 56°, it was found impossible to have wells. Mr. Shaw had attempted to dig one at the post of St. Agustin, about forty miles from the mountains; but though it was in the month of July, the ground was frozen at the depth of three feet from the surface, and as it grew harder he was obliged to give up the attempt. He relates also an account of Mr. Robson, an English engineer, who attempted to sink a well at Prince of Wales’s fort, latitude 59°, in the month of September. He first found thirty-six inches of earth thawed by the preceding warm weather, then a stratum of eight inches frozen as hard as a stone; under this a stratum of sandy friable earth, frothy and very dry, in which his borers could find no water. The celebrated traveller Ledyard, says Volney, affirms, that at Shukts, not so high as latitude 62°, wells of water cannot be obtained, because it is found by experiment that water-freezes at the depth of six feet. From these circumstances, M. Volney would infer that the internal part of the earth is in a constant state of congelation. Some of the above observations, we believe, were inadmissible; and it has been too hastily determined, that the earth is frozen during the whole year in North America, even in latitude 46°; for this is not the case 110° further north. We have been favoured with the following statement from an intelligent medical gentleman, who was some years resident in Hudson’s Bay. “On digging a well at York fort, Hudson’s Bay, latitude 57° 7′, in the beginning of October, the following circumstances were remarked. About thirty inches from the surface, a bed of frozen earth, about twelve inches thick, was met with; below was a bed of loose sandy clay, about half a yard thick, which was succeeded by a bed of the same clay, rendered perfectly hard and solid by frost. Sinking lower, similar beds of frozen and loose earth were found, alternating with each other; the frozen beds, however, constantly decreasing in thickness, though not regularly, and at a certain depth they seemed to disappear entirely. These frozen strata are considered by the inhabitants as indications of the severity of the preceding winters, each stratum being suppos’d, with much probability, to be formed in different years, and to be travelling downward until they are thawed by the internal temperature of the earth. The processes by which they sink down may be explained, on the supposition that the upper surface is diminishing by heat during summer, and the under surface increasing by the congelation of moisture in contact with it. Another circumstance, which took place in the same latitude, may serve to elucidate the obervation of Ledyard, that the water was constantly frozen at sixty feet under the surface at Shukts.” A well had been sunk which yielded a plentiful supply of water during the first summer; but the water, being exposed to the air, froze during the next winter, and remained frozen ever after, being too far below the surface to be thawed. Hence it appears that water exists unfrozen at a moderate depth under the surface in the coldest climates, when it has no communication with the external air. The effect of the summer heat in the same latitude extends about seventeen inches under the surface, where the ground has been shaded; but where it has been exposed to the sun, the surface is thawed to the depth of three feet. From the small depth to which the solar heat penetrates, we may infer that the water below is kept in a fluid state by the internal heat of the globe. It has been generally supposed, that the permanent temperature of each latitude is the same nearly as the mean annual temperature of the atmosphere, and that this is indicated by the temperature of springs or deep wells; but the temperature of springs will vary with that of the strata near the surface through which they run. (See Temperature of Springs.) It is to be regretted that more numerous observations have not been made on the temperature of deep mines. From observations recently made in Cornwall, it appears that the temperature increases with the depth, at least in some of the mines, and in the lowest it was not less than 75°. This may, perhaps, be owing to the chemical changes which are taking place; for it appears, from the evidence of the overseers of the mines, in reply to certain queries proposed by the Royal Geological Society of Cornwall, that the water is found constantly warmer in the vicinity of veins of copper-ore, than it is in the vicinity of tin-ore; the former veins are in general worked to a greater depth than the latter. It remains to be ascertained whether this increase of temperature be owing to chemical causes, or is invariable at the same distance from the surface. The decomposition of pyrites in copper veins would seem to point out a cause for the increased temperature in their vicinity; it is evident, however, that it is not derived from the solar rays. It seems reasonable to believe, from what we are present knowledge of the internal temperature of the earth, that there exists a permanent source of heat within the globe, though we are unacquainted with the causes by which it is generated. We are equally ignorant of the causes by which light is generated on the surface of the sun; one operation is not more surprising or inexplicable than the other; nor is the difficulty removed, by supposing the sun to be surrounded with a luminous atmosphere. Some philosophers have maintained the opinion, that the earth has been constantly growing colder since the period when it was first inhabited, and that the organic remains of animals and other animals, (supposed to be similar to those of tropical climates,) which are found in Siberia, offer a demonstrative proof, that the arctic regions once enjoyed the temperature of the torrid zone. It has since been ascertained, by the elaborate researches of M. Cuvier, that these animals were not of the same species as the African or Asiatic elephant. A most convincing proof of this was afforded by the entire body of one of these elephants, which was discovered imbedded in ice near the mouth of a river in the north of Siberia, by a Tungusian fisherman, in the year 1799. It first presented a shapeless mass projecting from an ice-bank. Two years afterwards he could distinctly see that it was the body of an enormous animal; the entire blank and one of its tusk had become disengaged from the ice. In 1803, the ice beginning to melt earlier than usual, the whole body was disengaged, and fell from the ice-bank on the sandy shore. In 1806, Mr. Adams went to examine this animal, which still remained on the sand, but its body was much mutilated. The skin was extremely thick and heavy, and as much of it remained as required the exertions of ten men to carry away. More than thirty pounds of the hair and bristles of the animal were collected. Some of this
TEMPERATURE.

For the temperature of the atmosphere, see Atmosphere, where the mean temperature in different latitudes is given. Mr. Humboldt has lately published a botanical account of the new genera and species of plants discovered in the tropical regions of America, with many interesting observations on the temperature, as affecting the growth of plants. The plants of the torrid zone extend farther through the southern temperate zone than through the northern, owing to the greater influence of the ocean in the southern hemisphere, in moderating the rigour of winter; the ocean bearing a much greater proportion to the surface on the south, than on the north side of the equator. In estimating the climate suited for the growth of particular plants, the mean temperature will not afford a correct standard; for though the mean temperature of the year, in the middle latitudes of North America, be the same as it is in Europe, 7° further north, the temperature of different seasons in these same latitudes by no means agrees. The winters are colder, and the summers hotter, in North America than in Europe. In Philadelphia the summer is as hot as at Rome or Montpellier, while the winter corresponds with that at Vienna. At Quebec the summer is warmer than at Paris, but the winter colder than at St. Petersburg. In the north of China there is a still greater difference between the heat and cold, than in North America.

In North America, as far as latitude 48°, the summers are four centigrade degrees, or about 7° Fahrenheit, hotter than in the corresponding latitude in Europe. Between the tropics, the mean annual temperature is the same as on the old continent, which may be seen in the following table, expressed in degrees of the centigrade thermometer.

<table>
<thead>
<tr>
<th>Old Continent</th>
<th>New Continent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senegambia</td>
<td>Cumana</td>
</tr>
<tr>
<td>Madras</td>
<td>Antilles</td>
</tr>
<tr>
<td>Batavia</td>
<td>Vera Cruz</td>
</tr>
<tr>
<td>Mantilla</td>
<td>Havannah</td>
</tr>
</tbody>
</table>

Twenty-five degrees correspond with seventy-seven degrees of Fahrenheit.

Though the plants of the torrid zone extend farther through the southern temperate zone than through the northern, as we have before stated; yet to a certain distance from the line, the temperature appears to be less on the south than on the north side. Rio Janeiro and Havannah are nearly at the same distance from the equator; but the mean temperature of the summer and winter months in each is as under:

<table>
<thead>
<tr>
<th>Rio Janeiro</th>
<th>Havannah</th>
</tr>
</thead>
<tbody>
<tr>
<td>June</td>
<td>December</td>
</tr>
<tr>
<td>July</td>
<td>January</td>
</tr>
<tr>
<td>January</td>
<td>July</td>
</tr>
<tr>
<td>February</td>
<td>August</td>
</tr>
</tbody>
</table>

On the coast of Peru, the temperature is diminished by the perpetual cloudiness of the sky, and by a strong sea current setting in from Cape Horn. From the tropic to 34° of south latitude, the mean temperature of the southern hemisphere scarcely differs from that of the northern. Between latitude 34° and 57°, there is a greater difference between the temperatures of summer than of winter: the winters in the southern hemisphere are not colder, but the summers are considerably more so than in the northern hemisphere. In south latitude 48°, the summer temperature is the same as the winter temperature of Toulon, Cadiz, and Rome.

The higher we ascend above the level of the sea, and the farther we advance from the equator, the greater is the difference.
difference between the temperature of different seasons of the year. The following table exhibits the temperature between the hottest and coldest months, in different latitudes.

<table>
<thead>
<tr>
<th>Location</th>
<th>Lat.</th>
<th>Cent. Therm.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cumana</td>
<td></td>
<td>10.27¹</td>
</tr>
<tr>
<td>Vera Cruz</td>
<td></td>
<td>19.11</td>
</tr>
<tr>
<td>Havana</td>
<td></td>
<td>23.8</td>
</tr>
<tr>
<td>Natches</td>
<td></td>
<td>31.28</td>
</tr>
<tr>
<td>Philadelphia</td>
<td></td>
<td>39.56</td>
</tr>
<tr>
<td>Quebec</td>
<td></td>
<td>40.47</td>
</tr>
<tr>
<td>Nain</td>
<td></td>
<td>57.00</td>
</tr>
</tbody>
</table>

In the temperate zone, as we advance northwards, the coldest of the winter increases at a much greater rate than the heat of the summer diminishes. Thus at Enonleis, in latitude 68⁰ 30', the temperature of July is as hot as that of Edinburgh. Between the tropics, the temperature at no season of the year equals that of the sea-shore; but in the temperate zone, the upper currents of air are sometimes warmer than the lower, during the winter months; and the thermometer, on the summits of hills, is occasionally three or four degrees higher than in the plains. Hence in the temperate zone, we find the same plants frequently on low and elevated situations; but this is never the case between the tropics. In the temperate zone on the old continent, when the mean heat of the month is as under, the following plants blossom:

<table>
<thead>
<tr>
<th>Plants</th>
<th>Fahrenheit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amygdalis perfests</td>
<td>42⁰</td>
</tr>
<tr>
<td>Prunus domestica</td>
<td>47⁰</td>
</tr>
<tr>
<td>Betula alba</td>
<td>52⁰</td>
</tr>
</tbody>
</table>

The reason why plants vegetate with greater rapidity in Lapland and Norway than farther south, is owing to the increment of temperature being much greater, and to the temperature of the earth in winter being several degrees above that of the air.

From observations made in different latitudes, it appears that 1000 fathoms of altitude occasion a diminution of temperature equal to 23⁰ of Fahrenheit; 50 fathoms being nearly equal to half a degree. Mountains 1000 fathoms in height, at 46⁰ of latitude, have the mean temperature of Lapland; and mountains of the same height between the tropics enjoy the temperature of Sicily.

The following table by Humboldt exhibits the most remarkable circumstances respecting the temperature in the three zones. The temperature is taken according to the centigrade thermometer. The fathom 6 French feet, or 6.39453 English feet.

<table>
<thead>
<tr>
<th>Torrid Zone</th>
<th>Temperate Zone</th>
<th>Frigid Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andes, Quito, Lat. 0⁰</td>
<td>Mountains of Mexico, Lat. 20⁰</td>
<td>Caucasus, Lat. 42⁰</td>
</tr>
<tr>
<td>Inferior limit of perpetual snow</td>
<td>2460 fa.</td>
<td>2350 fa.</td>
</tr>
<tr>
<td>Mean annual heat at that height</td>
<td>16⁰</td>
<td>-</td>
</tr>
<tr>
<td>Mean heat of winter, ditto</td>
<td>15⁰</td>
<td>-</td>
</tr>
<tr>
<td>Mean heat of Aug. ditto</td>
<td>14⁰</td>
<td>-</td>
</tr>
<tr>
<td>Distance between trees and snow</td>
<td>600 fa.</td>
<td>350 fa.</td>
</tr>
<tr>
<td>Upper limit of trees</td>
<td>1800 fa.</td>
<td>2000 fa.</td>
</tr>
<tr>
<td>Last species of trees towards the snow</td>
<td>Eucalyptus</td>
<td>Pinus occident.</td>
</tr>
<tr>
<td>Upper limit of the Ericinex</td>
<td>1600 fa.</td>
<td>-</td>
</tr>
<tr>
<td>Distance between the snow and corn</td>
<td>800 fa.</td>
<td>-</td>
</tr>
</tbody>
</table>

In the seventh volume of the Transactions of the Royal Society of Edinburgh, Dr. John Murray has published a paper on the diffusion of heat on the surface of the earth; in which he attempts to prove, from the nature of caloric, that the temperature of the earth is constantly increasing from the solar rays, and that this temperature is becoming more equal in different parts of the earth. The atmosphere, he contends, conveys no heat into unlimited space; our planet, in relation to the discharge of caloric from it, is bounded as it were by a wall of iron-conducting matter. He admits, however, that a small portion of heat may be lost by radiation; thus, at the hotter parts of the earth's surface, there may be some emission of caloric by radiation; but this, he says, cannot be equal to the quantity communicated by the solar rays; for of the heat derived from the latter source, a portion is absorbed by the earth, and conveyed to the interior, as is apparent from the decreasing temperature, as we recede from the surface to a certain depth; and another portion is carried off by the ascending current of heated air, and conveyed to colder regions, where it is absorbed. Thus, even
even from those parts of the surface of the earth where the circumstances are most favourable to radiation, the quantity radiated cannot be equal to the quantity received from the solar rays. Over the whole earth the diffusion must be still greater; and instead of the conclusion, that the planet discharges its excess of heat by radiation, there is every reason to draw the opposite conclusion, that part of the heat which it receives from the sun is retained. He further infers, that the temperature of the globe must rise, from the mode in which heat is communicated to it by the sun; and at the same time, as it advances, must become more equal over the whole surface. And this rise has its limits. There cannot be either unlimited increase of heat, or unlimited refrigeration; but the final result will be a state of permanence and uniformity, the continuance of which is secured by the very circumstance, that if it is deviated from, this deviation must correct itself by an increase of radiation from the hotter parts, or by an increased absorption of caloric by the colder parts of the globe. According to this theory, in processes of time, the equatorial and polar parts of the globe will arrive at the same degree of temperature, which will remain stationary, as there will be no circulation of heated air or water to the poles. To this reasoning we conceive it may be objected, that it assumes, without sufficient grounds, that caloric cannot pass from the earth into unlimited space, and that the solar heat does not become latent by chemical union with terrestrial substan substance. It affirms also, that caloric is a distinct specific substance; an opinion which is denied by some of the most eminent philosophers. Nor have we, perhaps, any evidence to prove that the temperature of the earth has changed since the earliest records of history, if we except the local changes which result from drainage and cultivation. It is well known that the climate of Europe is materially changed since the periods of ancient history, when the Danube was annually frozen, and would admit the passage of armies over the ice. The climate of the United States of America has also undergone a material change during the last century. Both these local changes have been produced by the same cause, the destruction of extensive woods, and the progress of agriculture; but, independently of local causes, we have no data to infer that the temperature of the globe is increasing or diminishing.

**Temperature of the Sea.** The temperature of the sea near the surface is affected by the changes of temperature of the atmosphere, and by the currents which traverse it. The currents which flow from the equatorial to the polar regions, serve to equalize the heat of different latitudes. This is remarkably the case with the current called the Gulf stream, which passes by the shores of Mexico, Louisiana, and Florida, and rounds the point of the peninsula, under the shelter and protection of the Bahama islands, which break the efforts of the ocean and the current of the trade wind. This stream, on entering the ocean, preserves its water by the velocity of its current, and may be further distinguished by its colour and temperature. The temperature is from eleven to twenty-two degrees higher than that of the ocean. From the Floridas to Newfoundland the current continues increasing in breadth, and diminishing in velocity. Some experiments made by Mr. Jonathan Williams, give the difference of temperature between the Atlantic ocean and the Gulf stream as under, December, 1789.

| Soundings in shoal-water, on the coast, | 60° | Fahrenheit. |
| Soundings in the stream, | 56° | |
| Before reaching Newfoundland, in the stream, | 47° | |
| At Newfoundland, out of the stream, | 40° | |
| Beyond the banks, in the open sea, | 30° | |

On approaching the coast of England, Capt. Billings, in 1791, found the temperature of the sea on the coast of America, - 54°; in the water of the Gulf stream, - 77°; in the water of the Gulf stream, - 45°. In winter, Mr. Williams found the variation between the Gulf stream and the ocean 25°; the difference, as might be expected, being less in summer than in winter. These inquiries have ascertained another fact, from whence navigators may derive some advantage; for by examining the temperature of the sea in different places, it has been found that the water is colder in proportion to its shallowness; and hence may be derived an indication of the approach to land, or to a shoal. Out of the reach of currents, a difference always exists between the temperature of the surface and the lower parts of the sea. In northern latitudes, the surface is sometimes warmer and sometimes colder than the lower parts; but near the equator, the temperature of the surface may be expected to be invariably warmer than at great depths. In all probability, the temperature of the sea is permanent in each degree of latitude, at a certain depth. Capt. Ellis let down a sea-gage in N. lat. 25° 13', W. long. 25° 12'; he found the sea falter and colder in proportion to the depth, till the gage had descended 3900 feet, when the mercury in the thermometer came up at 53°; but the water did not grow colder, though he let down the gage 1400 feet lower. At the surface of the sea, the thermometer stood at 64°.

From the experiments of Capt. Douglas, near the coasts of Lapland and Norway, of which an account is given in the 6th volume of the Philosophical Transactions, the following differences were observed between the temperature of the sea at the surface, and at certain depths.

| Temperature at the Surface. | Depth in Fathoms. | Temperature. |
| May 12, lat. 70° 40', | 36° Fahr. | 78 to 87 | 59° |
| May 17, nearly the same, | 37 | 86 to 90 | 39 |
| May 22, lat. 70° 32', 12 leagues from the island of Lofoot, | 47 | 100 not at the bottom. | 46 |
| June 20, lat. 70° 54', | 44 | 98 | 40 |
| July 7, lat. 70° 45', | 46 | 70 at the bottom. | 44 |
| July 8, lat. 68° 43'; 20 or 25 leagues from the coast of Norway, | 48 | 100 at the bottom. | 46 |
| July 9, lat. 65° 25', above 30 leagues from the coast of Norway, | 52 | 210 at the bottom. | 48 |

From
The temperature of Springs. Those common springs which throw up a considerable quantity of water during the whole year, have generally a permanent temperature, or nearly so; and this is supposed to represent the mean temperature of the earth in each latitude; but there are other springs which have a much higher permanent temperature, and some which throw up their waters at a boiling heat. The following is the permanent temperature of some of the more celebrated warm springs in Europe.

<table>
<thead>
<tr>
<th>Location</th>
<th>Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Matlock,</td>
<td>66°F</td>
</tr>
<tr>
<td>Buxton,</td>
<td>82°F</td>
</tr>
<tr>
<td>Bruttol,</td>
<td>74°F</td>
</tr>
<tr>
<td>Bath,</td>
<td>172°F</td>
</tr>
<tr>
<td>Vichy,</td>
<td>116°F</td>
</tr>
</tbody>
</table>

The Geyser or boiling fountains in Iceland, in the Azores, and in various parts of the world, have a constant temperature of 212°F. The source of heat, in some of the latter springs, is evidently subterranean fire, as all those islands are of volcanic origin, and are the seats of active volcanoes at the present day. It is observed of other warm springs, that they generally rise in the vicinity of volcanic or basaltic rocks. This is the case with the warm springs of Matlock and Buxton. Rocks of basaltic amygdaloid extend through the high peak of Derbyshire, where these springs are situated. Rocks of basaltic amygdaloid, having a still more peculiar resemblance to volcanic lava, extend from Worcestor bridge, in Gloucestershire, in a direction southward, and, in all probability, are continued under the surface to Bath and Bruttol. According to Humboldt, hot springs rise from granite and rocks denominated primary, in various parts of South America; and, from the permanent high temperature of warm springs, we may infer that the source of heat is situated deep beneath the surface, and far below those causes which can change the temperature. It has been contended by some persons, that the high temperature of warm springs arises from the decomposition of pyritic flata; but if this were the case, the waters would be strongly impregnated with sulphate of iron and other mineral matters, which is not the fact; the temperature would also decrease as the pyritic matter became exhausted, of which we have an analogous illustration in the saline springs of Cheltenham and Gloucester. These springs rise in a deep stratum of blue clay, denominated litts, (see Strata of England,) which abounds in pyrites, and in animal remains; and it is found by experience, that the saline impregnation is greatest where the wells are first opened, and that the strength of the waters gradually declines; on which account, the proprietors are under the necessity of sinking fresh wells to obtain water of the requisite saline strength. This might be expected; for as the water percolates through fissures in the clay, the saline matter in its vicinity is gradually washed away. But if the whole bed were in a state approaching to ignition, from the decomposition of pyrites, the saline impregnation would be constantly supplied to the springs; for we cannot suppose any quantity of pyritic matter to exist equal to heat a whole stratum by decomposition, without, at the same time, generating such an abundance of saline matter as must saturate the waters which percolate through it. We are hence led to infer that the source of heat in warm springs is subterranean fire, and these springs have not been observed to diminish in temperature for a period of nearly two thousand years, we may further infer the great depth at which this source of heat is situated, an inference which is warranted by the connection which volcanoes in distant parts of the world appear to have with each other. (See Volcano.) It may be asked, if the source of heat in warm springs be subterranean fire, why are they not all of the same degree of temperature? To this it may be replied, that, in some instances, the warm springs may be intermixed with cold springs near the surface; and in other instances, after rising to a certain height, they may run in an horizontal direction for a considerable distance among the upper strata, and thus be gradually cooled. The cause which can raise up water from vast depths, must be sought for in the expansive power of steam, and effusive vapours generated by heat, which we know by experience to be fully adequate to the effect.
TEMPERATURE for Plants, in Gardening, the state of heat in which it is necessary to keep particular sorts of them, in order to their flowering or taking root, their healthy growth, and their succeeding in the best and most proper manner. The state or degree of heat, or the temperature, in all such cases, must be regulated and directed by the nature of the plants, their culture, and the situations in which they are grown. For those in hot-houses and stoves, the temperature, in those of the dry flow kind, should mostly be from about fifty to seventy degrees, according to the nature of the plants and manner of growth of the plants; and in those of the moist flow kind, from about sixty to ninety degrees, as the nature of the beds and plants may be. Plants in conservatories are kept at various temperatures between those of the first kind of the above stoves and that of the common open air. And in greenhouses, nearly similar temperatures are constantly to be preferred, in order to the raising, and to the growth of such plants, in the most suitable and best manner.

It is always of great utility and importance to keep the temperatures as steady as possible, whatever its state may be, in the growth of all these sorts of tender plants.

The temperatures, or states of heat for particular plants, are mostly given under their proper heads, in describing their culture.

TEMPERATURE of Milk for Chefs, in Rural Economy, the degree of heat which is the most proper in milk for the purpose of making cheese. From some experiments which have been lately made upon the subject, this temperature would seem to be about the middle point between that of summer and blood heat; or, perhaps, somewhere about ninety degrees of Fahrenheit's scale may give the average degree of warmth which is most proper and necessary in the business.

TEMPERING, in the Mechanic Arts, the preparing of steel and iron, so as to render them more compact, hard, and firm; or even more soft and pliant; according to their respective occasions.

These metals are tempered by plunging them, while red-hot, into some liquor prepared for the occasion; sometimes pure water is used for that purpose: our locksmiths, &c. scarcely use any other.

When an instrument has been properly hardened, it is necessary to give it a certain degree of softness, in order to adapt it for the purpose to which it is to be applied. With this view, it should be heated again to a certain point, usually determined by its colour, and then infatantly plunged into cold water. This is called "letting it down to the proper temper." It has been a question of difficult solution, how the water acts in hardening iron and steel. It is well known, says Mr. Parke, in his "Chemical Essays," (vol. iv.), that the hotter any piece of iron is made, and the more quickly it is cooled, the harder it will become in its texture; and he suggests that this may be owing to the loss of its latent heat. In confirmation of this conjecture he alleges, that iron and steel are generally allowed to owe their malleability to their latent heat.

A composition of divers juices, liquors, &c. has sometimes been used; which is various according to the opinion and experience of the workman: as vinegar, muste-ear water, nettle or Spanish radish-water, the water oozing from broken glaftes, fuel, salt, foot, directed wine, fal ammoniac, urine, &c. But these methods are now generally abandoned. Mr. Stoddart, a very ingenious and scientific cutter in London, says, (as Mr. Nicholson informs us, Journal, vol. iv. 410.) that one of his workmen makes up his charcal fire with shavings of leather, finding that this is effectual in preventing the tools from cracking in the process of hardening; and he says, that he has found no advantage from the use of salt in the water.

To harden and temper English, Flemish, and Swedish steel, you must give them a pretty high heat; then suddenly quench them in water to make them hard; but Spanish and Venetian steel will need only a blood-red heat before they be quenched.

In consequence of this operation, all the qualities of steel are changed; so that from being very ductile and soft, it becomes so hard and stiff, that it is no longer capable of being cut by the file, but is itself capable of cutting or piercing very hard bodies, and that it does not yield to the hammer, but may be sooner broken in pieces than extended. It becomes also porous, brittle, very elastic, and capable of acquiring the most beautiful polish. This hardness and ductility of steel may be diversified by varying the temper. The hotter the steel is when tempered, and the colder the water into which it is plunged, the greater hardeness it acquires, but at the same time it becomes so much more brittle. The coldness of the water may be increased by diffusing faults in it: observing that water is always colder while the faults continue diffusing; and that the steel will cool sooner by being stirred about or placed in a stream, so as to come in contact with water not already made warm. On the contrary, the less hot the steel is when tempered, and the hotter the water is in which it is tempered, the less hard it becomes, and also the greater ductility it retains; and the proper degree of heat is always relative to the use for which the tools made of the steel are intended.

If the steel be too hard or brittle for an edged tool, &c. let it down by rubbing a piece of grindstone or whetstone hard upon the work, to take off the black scurf: then brighten, or heat it in the fire: and as it grows hotter, you will see the colour change by degrees, in the manner and by the gradations stated under the article CUTLERY.

Saw-makers temper their tools by rubbing them over with fuel or other grease, and then heating them gradually till the temperature of each tool is sufficiently raised to set fire to the grease of itself and occasion it to blaze. They are thought to acquire in this mode of treatment a temper equal to that which would be obtained by heating them in the usual way, till they became of a deep blue. This operation, which is practised at Sheffield, is called "blazing." For the method of tempering files, in which the great desideratum is to blend tenacity with hardness, see FILE.

In the year 1789, Mr. David Hartley took out a patent for a method of tempering steel by the aid of a pyrometer or thermometer applied near to the surface of the article, and at the same time recommended the use of heated oil, in which (he says) many dozens of razors or other tools might be tempered at once with the utmost facility, and the various degrees of heat necessary for different purposes might speedily be determined by experiment. (See Nicholson's Journal, vol. iv. 410.) An improvement of this principle has been since suggested by Mr. Parkes (Chem. Eff. vol. iv.) by providing a bath of oil or of some kind of fusible metal for the tempering of every species of edged tool, which contrivance would, in his opinion, give to this operation a greater degree of certainty, than has ever been experienced by those who have conducted such manufactories. See TILLING.

Steel is usually cold tempered, because in many manufactories, the custom is to temper it as soon as it is made, probably that the purchasers of it may be better able to judge of its quality. When this steel is to be used, it must be untempered by heating it more or less, and letting it cool
cool slowly, that it may be extended, filed, and receive the necessary form; after which every workman tempers it again in his own way.

M. Berthoud, in his treatise on marine clocks, recommends hardening the fleel-balance wheel, by daubing it over with foot (or wood) moistened with urine, putting it into a small box of thin iron-plate, and covering it over with the same composition. This box with its contents is to be heated to a blood-red, and then the wheel taken out suddenly and quenched.

Mr. Harrison and M. Berthoud seem to agree upon the whole, that the balance-spring of time-pieces should be hardened and tempered after it has been cooled up in its proper form; and not tempered first and cooled up afterwards, as is the practice in making the main-spring. Some curious workmen, in order to equally temper small fleel instruments, employ melted lead as an intermedium. A plate of iron floats upon the melted lead, and receives from it, in all its parts, an equal heat: the pieces of fleel laid upon this plate, acquire all at once the same degree of heat, and are at once quenched in water; the blue or other colours, which they succeedly assume, affording sure marks of the proper points of heat at which they are to be quenched, according to the different degrees of hardeness required in them. Lewis's Com. Phil. Techn. p. 32.

For the method of tempering fleel bars for artificial magnets, practised by Mr. Canton, see Artificial Magnet.

The ancients appear to have had a better method of tempering than any of the moderns are acquainted with; witness their works in porphry; a stone so hard, that scarcely any of our tools make any impression upon it.

Tempering of Land, in Agriculture, a term signifying the preparing it for a crop, especially of wheat. It is a term in much use in Norfolk. It implies all the various operations that may be undertaken in this intention.

TEMPEST, TEMPESTAS, a storm or violent commotion of the air, with or without rain, hail, snow, &c.

Tempest, in Mythology, a deity among the Romans, concerning whom we merely know, that Marcellus, as an acknowledgment for having escaped a storm, with which he was overtaken at sea, between the islands of Corsica and Sardinia, built a temple to her without the Porta Capena.

TEMPESTA, ANTONIO, in Biography, was an ingenious designer and painter, born at Florence in 1555, and was initiated in the art by Santi di Tito; afterwards he studied under another artist, whose name was Stradanus. Tempesta was gifted with a brilliant and powerful imagination, not, however, of the most correct or exalted kind. His favourite subjects were battles, sieges, cavalcades, huntings, processions, &c.; all of which he arranged and designed in a novel and rich style, and executed with uncommon spirit and energy. He was employed by Gregory XIII. in the Vatican, where he adorned with grotesque inventions, and some few historical productions. He was also employed by the marchese Jufthinius in decorating his palace; and in several of the churches of Rome, Tempesta's paintings may be found.

He not only exercised his genius and time with the pencil, but devoted much of both to the etching needle; having left behind him nearly 1800 plates of different kinds, and of very considerable merit. He died in 1630, aged 75.

TEMPLE, in Geography, a town of the island of Sardinia; 25 miles E. of Castello Aragonese.—Alfo, a town of Mexico, in the province of Guadalajara; 500 miles N.W. of Mexico.

TEMPLARS, TEMPLARS, or Knights of the Temple, a religious military order, first established at Jerusalem, in favour of pilgrims travelling to the Holy Land.

The original of this order, the first military one in the world, is this: in 1118, some pious and noble personages devoted themselves to the service of God, in the presence of the patriarch of Jerusalem; promising to live in perpetual chastity, obedience, and poverty, after the manner of canons.

The two principal personages were Hugo de Pagani, and Geoffry of St. Omer. Baldwin II. then king of Jerusalem, gave them an apartment in his palace, near the temple at Jerusalem, not far from the sepulchre of our Saviour; whence their denomination Templars.

Soon afterwards, the canons of the temple gave them a piece of ground near the said temple, on which to build regular houses; and the king, the lords, the patriarch, and the prelates, each gave them something out of their revenue for food and clothes.

Their first undertaking, and what they had first in view at their institution, was, to guard the highway against robbers, &c. chiefly for the safety of pilgrims and crosses.

The principal articles of their rule were: that they should hear the holy office throughout every day; and that, when their military duties should prevent this, they should supply it by a certain number of pater noctors: that they should abstain from flesh four days in the week, and on Fridays from eggs and milk-meats; that each knight might have three horses, and one esquire: and that they should neither hunt nor fowl.

In the year 1228, this order acquired stability, by being confirmed in the council of Troyes, and subjected to a rule of discipline drawn up by St. Bernard.

In every nation they had a particular governor, called master of the temple, or of the militia of the temple. Their grand-master had his residence at Paris.

The order of Templars flourished for some time, and acquired by the valour of its knights immense riches, and an eminent degree of military renown: but as their prosperity increased, their vices were multiplied, and their arrogance, luxury, and cruelty, rose to such a monstrous height, that their privileges were revoked, and their order suppressed with the most terrible circumstances of infamy and severity. Their accusers were two of their own body, and their chief professor Philip the Fair, of France, who addressed his complaints to Clement V. The pope, though at first unwilling to proceed against them, was under the necessity of complying with the king's desire, so that, in the year 1307, upon an appointed day, and for some time afterwards, all the knights, who were dispersed throughout Europe, were feized and imprisoned. Such of them as refused to confess the enormities of which they were accused, were put to death; and those who, by tortures and promises, were induced to acknowledge the truth of what was laid to their charge, obtained their liberty. In 1312, the whole order was suppressed by the council of Vienne. A part of the rich revenues they possessed was bestowed upon other orders, especially on the knights of St. John, now of Malta, and the rest confiscated to the respective treasuries of the sovereign princes in whose dominions their possessions lay. —The knights Templars, in order to justify the severity with which they were treated, were charged with apostacy to the Saracens, and holding correspondence with them; with insulting the majesty of God; turning into derision the Gospel of Christ; and trampling upon the obligation of all laws, human and divine. Candidates, it is said, upon admission to this order, were commanded to spit, in token of contempt, upon an image of Christ, and after admission, to worship either a cat, etc.
cat, or a wooden head crowned with gold. It is farther
affirmed, that, among them, the odious and unnatural act
of sodomy was a matter of obligation; and they are charged
with other crimes too horrible to be mentioned, or even
imagined. However, though there be reason to believe
that in this order, as well as others of the same period, there
were shocking examples of impiety and profliocity; yet that
the whole order was thus enormously corrupt, is so far from
being proved, that the contrary may be concluded even
from the acts and records, yet extant, of the tribunals be-
fore which they were tried and examined. If to this we
add, that many of the accusations advanced against them
flatly contradict each other, and that many members of this
unfortunate order solemnly avowed their innocence, while
lunguishing under the severest tortures, and even with their
crying breath; it would seem probable, that this king Philip
of foot this bloody tragedy, with a view to gratify his
avarice, and glut his resentment against the Templars, and
deliberately against their grand-mother, who had highly
offended him. The principal cause of this invincible hatred
against them was, that in his quarrel with Boniface VIII.
the knights procured the caufe of the pope, and furnished
him with money to carry on the war. Molheim's Eccl.
Hist. vol. iii. ed. 8vo. Bower's Hist. of the Popes, vol. vi.
P. 393.

TEMPLE, Templum, a public building erected in
honour of some deity, either true or false; and in which
the people meet to pay religious worship to the same.
The word is formed from the Latin templum, which some
derive from the Greek τηπεινός, signifying the same thing;
and others from tempus, alēgno, E I cut v s, IP separated, because
a temple is a place separated from common uses; others, with
more probability, derive it from the old Latin word temperare,
to contemplate. It is certain the ancient augurs gave the name
temple to those parts of the heavens which were marked out
for the observation of the flight of birds. Their formula
was this: Templae tegmenta.

Temples were originally all open, and hence received their
name. See Phil. Trans. No. 471. sect. 5; where we have
an account of the ancient temple in Ireland of the fame fort
as our famous Stonehenge.

The word templum, in its primary sense among the old
Romans, signified nothing more than a place set apart, and
consecrated by the augurs, whether enclosed or open; in the
city, or in the fields.

Clemens Alexandrinus and Eusebius refer the origin of
temples to the sepulchres built for the dead. This notion
has been lately illustrated and confirmed by a variety of tel-
monies by Mr. Farmer, in his Treatise on the Worship of
Human Spirits, p. 373, &c. Herodotus, Lucian, and
Strabo, will have the Egyptians to have been the first who
built temples to the gods; and from them the custom was
propagated to the Assyrians, comprehending under this ap-
pellation Phœnicia, Syria, and other countries. From
Egypt and Phœnicia it paffed to Greece with the colonies;
and from Greece to Rome. The first erected in Greece is
ascribed to Deucalion by Apollonius (Argonaut. lib. iii.)
and the first in Italy by Damis.

In antiquity we meet with many people who would not
build any temples to their gods, for fear of confusing them
to too narrow bounds. They performed their sacrificies
in all places indiscriminately, from a persuasion, that the whole
world is the temple of God, and that he required no other.
This was the doctrine of the magi, followed by the Per-
ians, the Scythisans, the Numidians, and many other nations
mentioned by Herodotus, lib. i. Strabo, lib. xv. and
Oecron, in his second oration against Verres.

The Persians, who worshipped the sun, believed it would
wrong his power, to enclose him in the walls of a temple,
who had the whole world for his habitation; and hence,
when Xerxes ravaged Greece, the magi exhorted him to
defroy all the temples he met with.

The Sicilians would build no temples to their goddes
Coronis; nor did the Athenians, for the like reason, erect any
statue to Clemency, who, they said, was to live in the hearts
of men, not within stone walls.

The Bithynians had no temples but the mountains to wor-
ship on; nor had the ancient Germans any other but the
woods.

Even some philosophers have blamed the use and building
of temples, particularly Diogenes, Zeno, and his followers
the Stokies. But it may be said, that if God hath no need of
temples, men have need of places to meet in for the public
offices of religion: accordingly, temples may be traced back
even unto the remotest antiquity. See Hofsinian, de Ori-
ginis Templorum.

The Romans had several kinds of temples; of which tho-
built by the kings, &c. consecrated by the augurs, and in
which the exercise of religion was regularly performed, were
called, by way of eminence, templis, temples. Those that
were not consecrated were called adscs. The little temples,
that were covered or roofed, they called adicula; those
open, fascella. Some other edifices, consecrated to particular
mysteries of religion, they called fasces and delubra.

All these kinds of temples, Vitruvius tells us, had other
particular denominations, according to the form and manner
of their construction; as will hereafter be specified.
Indeed, the Romans out-did all nations with regard to
shelves; they not only built temples to their gods, to their
virtues, to their difeases, &c. But also to their emperors, and that
in their life-time; instances of which we meet with in medals,
inscriptions, and other monuments. Horace compliments
Augustus hereupon, and lets him above Hercules, and all
the heroes of fame; in that those were only admitted into
temples after their death, whereas Augustus had his temples
and altars while living.

"Prefenti tibi maturos largimus honoros ;
Jurandaque tuum per nomen ponimus aras."

Epil. ad Aug.

Suetonius, on this occasion, gives an instance of the mo-
desty of that emperor, who would allow of no temples being
erected to him in the city; and even in the provinces, where
he knew it was usual to raise temples to the very proconsuls,
refused any but those erected in the name of Rome as well
as his own. Vide Suet. in Octav. cap. 52.

Whenever a temple was to be erected, the aruspices were
consulted as to the site of it, and the time when the con-
struction of it was to commence. The spot assigned to it
was carefully purified, and it was encircled with fillets and
garlands. The veils, accompanied with young boys and
girls, washed the ground with water, and the priest expiated
it by a solemn sacrifice. Then he touched the foundation
stone, and bound it with a fillet; and the people, animated
with extraordinary zeal, threw it in thither with some pieces
of money, or metal which had not paffed through the fur-
nace. When the edifice was finished, it was consecrated
with a variety of ceremonies, in which the priests, in their
absence, some of his college, prefided. Some of these temples
were not to be built within the precincts of cities, but with-
out the walls, as those of Mars, Vulcan, and Venus, for
reasons particularly assigned by Vitruvius. The temples
were held in great veneration; and, in some cafes, they were
a sanctuary for criminals and debtors. Within them were
very
very much adorned; particularly with costly statues of their gods and great men, and a great variety of votive offerings.

The most celebrated of the ancient temples among the Pagans were the following: viz. the temple of Belus (see Belon and Babylon); the temple of Vulcan at Memphis, the magnificence and extent of which are highly extolled by Herodotus; the temple of Jupiter at Thessalon: and Didyma; that of Andera at Hermathena; that of Protes at Memphis; that of Minerva at Sais; the temple of Diana at Ephesus (see Diana); the temple of Apollo in the city of Miletus, which, as well as that of Diana, was of the Ionic order; the temple of Eleusis, built in honour of Ceres and Proserpine, capable of containing 30,000 persons; the temple of Jupiter Olympus at Athens, of the Corinthian order; and the temple of Apollo at Delphi, so famous for its oracles, and for the rich presents with which it was enriched (see Delphi); the temple of Jupiter, which contained his admirable statue. The architect of the temple was Libo, a native of the country: its height from the area to the roof was 68 feet, its breadth 95, and its length 230. The throne and statue of the god, for we cannot enumerate other splendid ornaments, were the master-piece of Phidias; and antiquity produced nothing so magnificent or so finished. The statue, of an immense height, was of gold and ivory, so artificially blended, that it could not be beheld but with astonishment. The god wore upon his head a crown, which resembled the olive-leaf to perfection; in his right hand he held a victory, likewise of gold and ivory; and in his left a sceptre of exquisite tafle, refugient with all sorts of metals, and supporting an eagle. The shoes and mantle of the god were of gold; and upon the mantle were all sorts of animals and flowers engraved. The throne was all sparkling with gold and precious stones. The ivory and ebony, the animals there represented, and several other ornaments, by their embellishment, formed a delightful variety. At the four corners of the throne were as many Victories, that seemed to be joining hands for a dance, besides two others that were at Jupiter's feet. The feet of the throne, on the fore-side, were adorned with sphinxes, who were plucking the tender infants from the bosom of the Thban mother; and under whose weight were to be seen Apollo and Diana, wounding Niobe's children to death with their arrows. Four crofs bars that were at the feet of the throne, and went from one end to the other, were adorned with a great number of figures extremely beautiful: upon one were represented seven conquerors at the Olympic games; upon another appeared Hercules, ready to engage with the Amazons, and the number of combatants on either side was twenty-nine. Besides the feet of the throne, there were likewise pillars to support it. In fine, a great ballustrade, painted and adorned with figures, railed in the whole work. Pausanias, an able painter of that time, had represented here, with infinite art, Atlas bearing the heavens upon his shoulders, and Hercules in an attitude of rising to throw him of the load. Theseus and Pirithous, the combat of Hercules with the lion of Nemea, Ajax offering violence to Cassandra, Hippodamia with her mother, Prometheus in chains, and a thousand other facts of fabulous history. In the most elevated place of the throne, above the head of the god, were the Graces and Hours, of each three in number. The pedicell which supported this pile, was equally adorned with the rest. There Phidias had engraved upon gold, on the one side, the Sun guiding his chariot; on the other, Jupiter and June, the Graces, Mercury, and Vesta. There Venus appeared rising out of the bosom of the sea, and Cupid receiving her; while Pitho, or the goddess of perfusion, was presenting her with a crown. There also appeared Apollo and Diana, Minerva and Hercules. At the bottom of the pedicell, you might have seen Amphitrite and Neptune, and Diana or the moon, who appeared mounted on horseback. In fine, a woollen veil, of a purple dye, and magnificently embroidered, the present of king Antiochus, hung from top to bottom. The throne and statue reached from the pavement, which was of the finest marble, to the roof.

Italy abounded with temples as much as Greece; several of which were remarkable for their singularity or magnificence. Rome was full of temples: some of the most remarkable for their origin, materials, structure, or use, were the following: viz. the temple of Apollo, built by Augustus, in honour of his favourite deity Apollo, after his victory at Actium, upon mount Palatine. Its structure was very magnificent; it was built of the finest marble of Chios, and embellished, both within and without, with the richest ornaments. Its gates were of ivory, enriched with balsam-relievo, representing the Gauls, when they were thrown headlong from the top of the Capitol by T. Manlius. In the frontispiece was a chariot of the sun, of mally gold, crowned with rays so refulgent that they dazzled the eyes of beholders. Within the temple was a marble statue of Apollo, made by Scopas, and also a colossal one of brafs, 50 feet high; together with a candlestick in the form of a tree, whose branches were covered with clusters of lamps resembling fruit. Upon these branches the poets used to hang their poems, which they offered up to Apollo, as Horace informs us, ep. 3. 1. To this temple, dedicated to the "god of arts," was very properly annexed a noble library.—The temple of Bacchus, situated without the walls of Rome, is now the church of St. Constanfia, supported on the inide by twenty-four noble pillars of granite. Its ancient mosaic ceiling, and the old window by which light was let in from the roof, still remain. Behind the present altar stands an antique urn of porphyry, of large dimensions; and on each side of the altar, a finely wrought antique candlestick of marble.—Here was the temple of the goddesses Bona, who was Drysas, the wife of Fauns, distinguished by her exemplary chastity. The Roman ladies sacrificed to her in the night, in a little chapel, into which the men were not allowed to enter, nor were they permitted to be present at her sacrifices. It was for the violation of this rule, that Cicero profecuted the de- branched Clodius. (See his article.)—The temple of Diana was seated on mount Aventine. It was built in the reign of Servius Tullius, at the joint expence of the Romans and Latins, for the purpose of their meeting annually to offer a sacrifice, in commemoration of the league made between the two nations.—The first temple of Faith is said to have been erected by Numa, who taught the Romans to worship this goddess, and thus to be reminded, that the most sacred oath they could take was to swear by their faith or veracity. His intention was to render their promisnes, without writings or witnesses, as firm and certain as contracts made and sworn to, and the greater solemnities; and in this he succeeded to his wish. Polybius bears this honourable testimony to the Romans, that they inviolably kept their faith, that is, their word, without having occasion for witnesses or seurites; whereas nothing could bind the Greeks to their promises.—

The temple of Honour was built by Mutilus, by order of Marius, and might be reckoned among the noblest buildings in ancient Rome, if the materials, which were stone, had corresponded to the greatest of the design. It was remarkable for this circumstance, that the entrance of it was dedicated to Virtue, and the right to Honour; and that it had no paticular, or back-door, as other temples had; thus intimating, that we must not only pace through virtue to attain
TEMPLE.

to honour, but that honour is also obliged to repass through virtue, that is, to pervade in it, and acquire more of it.—The temple of Janus. The Romans built, at different times, three temples to Janus; for an account of which, see Janus.—The temple of Jupiter the Preserver was one of the sixty temples that stood upon the Capitoline hill. Jupiter Cuflos was re-presented in it, holding his thunder with one hand, and a dart with the other, and the figure of the emperor was under his thunder, to shew that he was under Jupiter's protection; or else engraved, lying upon a globe, and holding an image of victory, with the eagle at his feet, and these words, "Lovi Confervatori Auguftrorum noftrorum."—The temple of Jupiter Optimus Maximus, or Jupiter Capitolinus, was most commonly called the Capitol; which fea.—The temple of Liberty was built upon mount Aventine, on the spot where Cicerò's house once stood, enriched with several brafs pillars, and many fine statues.—The temple of Mars Fluid on the declivity of the Capitoline hill. In this temple were kept the eagles and other military ensigns of the Romans, and also the chariot in which Caesar had triumphed.—The temple of Peace was begun by the emperor Claudius, and finished by Vespasian, who embellished it with paintings and statues of the greatest masters, and also deposited in it all the spoils and riches taken by his son Titus in the temple of Jerusalem. It was burnt in the reign of Commodus.—The temple of Jupiter the Avenger was the Pantheon; which fee. To the temples already enumerated, we might add those of Antoninus and Faunula, of Augustus, of Augustus and Bacchus, of the Mufes, of Ceres, of Claudius Cæsar, of Concord, of Fame, of the Flavian family, of Faunus, of Fever, of Trajan and Neptune, of Happiness, of Faith and Jupiter the Prever, of Flora, of Bad Fortune, of the eldest or first-born Fortune, of Public Fortune, of Virile or Courageous Fortune, of Hercules, of Juno, of Juno Moneta, of Juno Sospita, the giver or prever of health, of queen Juno, of Jupiter Feretrius, of Jupiter Stator, of Jupiter Tonans or the Thunderer, of Jupiter the Conqueror, of Liber, an epitaph of Bacchus, of the Mother of the gods, of Mercury, of Minerva, of the goddefs Nenia, of Opis and Saturn, of the Penates or Household gods, of Reit, of Quirinus, of Romulus and Remus, of Saturn, of Serapis, of the Sun and Moon, of the god Sylvanus, of Tellus or the Earth, of Venus, of Venus and Cupid, of Venus Erycina, of Venus Erycina and the Mind, of Venus Verticordia, of Vertumnus, of Veja, and many others, which, great and small, amounted to upwards of one thousand.

TEMPLE, Jerusalem, was an edifice erected much after the model of the tabernacle, but in a much more magnificent and expensive manner. According to the opinion of some, there were three different temples: the first built by David and Solomon on mount Moriah, which was part of mount Sion; the second, by Zerubbabel and Joshua the high priest; and the third by Herod. This last, however, the Jews will not allow to be a new temple, but only the second repaired or rebuilt. The expense of building Solomon's temple was prodigious: the gold and silver employed for this purpose amounted to upwards of eight hundred millions sterling (1 Chron. xxii. 14. xxix. 4. 6, 7.), which says Dr. Prideaux, was sufficient to have built the whole temple with solid silver. But as the book of Chronicles was written after the return from the Babylonish captivity, it is probable that the Jews might compute by the Babylonish talent, which was little more than half the Mofiac talent, or perhaps by the Syriac talent, which was but one-fifth of the Babylonish; and thus the whole quantity of gold and silver would be reduced to a comparatively moderate quantity, and yet sufficient for the purpose.

Josephus (lib. viii. xiv. ii.) acquaints us, that the two first sums were only one-tenth part of what is expressed in the present Hebrew; and Dr. Kennicott (State of the Hebrew Text, vol. ii. p. 355.) thinks it probable, that a cipher was added to them both in some very ancient Hebrew copy.

This temple was surrounded, except at the front or east end, with three stories of chambers, each five cubits square, which reached to half the height of the temple; and the front was graced with a magnificent portico, which rose to the height of a hundred and twenty cubits. It was plundered by Nebuchadnezzar king of Babylon, and at length destroyed, after it had stood, according to Josephus, four hundred and twenty years, six months, and ten days, from its dedication. Others, however, as Calvius and Scaliger, reduce the number of years to four hundred and twenty-seven, or four hundred and twenty-eight; and Ufher, to four hundred and twenty-four years, three months, and eight days.

The second temple was built by the Jews, after their return from the Babylonish captivity, under the direction and influence of Zerubbabel their governor, and of Joshua the high priest, with the leave and encouragement of Cyrus the Persian emperor, to whom Judæa was now become a tributary kingdom. According to the Jews, this temple was defitute of five remarkable appendages, which were the chief glory of the first temple; viz. the ark and mercy-seat, the Shechinah, the holy fire on the altar, which had been first kindled from heaven, the urim and thummim, and the spirit of prophecy. This temple was plundered and profaned by Antiochus Epiphanes, who also caused the public worship in it to cease; and afterwards purified by Judas Maccabæus, who restored the divine worship; and after having stood five hundred years, rebuilt by Herod, with a magnificent approach to that of Solomon's. Tacitus calls it immensa opulentia templum; and Josephus says, it was the most astonishing structure he had ever seen, as well on account of its architecture as its magnitude, and likewise the richness and magnificence of its various parts, and the reputation of its sacred appurtenances. This temple, which Herod began to build about sixteen years before the birth of Christ, and far completed in nine years and a half, as to be fit for divine service, was at length destroyed by the Romans on the same month and day of the month, on which Solomon's temple was destroyed by the Babylonians.

The Jewish temple itself consisted of the portico, the sanctuary, and the holy of holies; and it was ornamented with spacious courts, making a square of half a mile in circumference. The first court was called the court of the Gentiles, because they were allowed to come into it, but no farther. Within this was a less court, into which none but Israelites might enter, divided into the court of the women; and the inner court, in which the temple and altar stood, and into which the priests and all male Israelites might enter.

TEMPLE, in Architecture. The ancient temples were distinguished, with regard to their construction, into various kinds: as,

TEMPLE in ante, Ædes in antîs. These, according to Vitruvius, were the most simple of all temples, having only angular pilasters, called ante, or paraîste, at the corners, and two Tuscan columns, on each side of the doors.

TEMPLE, Tetraîyle, or simply tetraîyle, was a temple that had four columns in front, and as many behind. Such was the temple of Fortuna Virilis at Rome.

TEMPLE, Proîyle, that which had only columns in its front,
front, or fore-side. As that of Ceres at Eleusis, in Greece.

TEMPLE, Amphiprostyle, or double profile, that which had columns both before and behind, and which was also tetra sty le.

TEMPLE, Periptere, that which had four rows of inflated columns around, and was exostyle, i.e. had six columns in front; as the temple of Honour at Rome. See Periptere.

TEMPLE, Diptere, that which had two wings, and two rows of columns around, and was also ostostyle, or had eight columns in front; as that of Diana at Ephesus.

TEMPLE, Pseudo-diptere. See Pseudo-diptere.

TEMPLE, Hypothoron. See Hypothron.

TEMPLE, Monoptere. See Monoptere.

Temples, among us, denote two inns of court, thus called, because anciently the dwelling-house of the knights Templars.

At the supposition of that order they were purchased by some professors of the common law, and converted into hospitals, or inns of courts.

They are called the Inner and Middle Temple, in relation to Effex-houfe, which was also a part of the house of the Templars, and called the Outer Temple, because situated without Temple-Bar.

In the Middle Temple, during the time of the Templars, the king's treasure was kept; as also that of the kings of France in the house of the Templars at Paris.

The chief officer was the master of the Temple, who was summoned to parliament in 49 Hen. III. And from him the chief minister of the Temple church is still called Master of the Temple.

TEMPLE, Sir Wiliam, in Biography, a statesman and miscellaneous writer, was the son of Sir John Temple, master of the rolls in Ireland in the reign of Charles I. and II., and author of a History of the Irish Rebellion, and born in London in the year 1628. Having finished his course of classical education, he was entered, at the age of seventeen, at Emmanuel college, in the university of Cambridge, under the tuition of the learned Cudworth. Being designed for public life, his principal attention at the university was engaged by the study of the modern languages, French and Spanish; and at the age of twenty, he was sent to finish his education by travelling on the continent. After spending six years in this way, he returned home in 1654, and married the daughter of Sir Peter O'Shore, of Chickland, Bedfordshire, with whom he became acquainted during his foreign travels. Declining to accept any office under Cromwell, he resided with his father in Ireland, and devoted his time to the study of history and philosophy. At the Restoration he became a member of the Irish Convention; and in the Irish parliament of the year 1661, he was returned as a representative of the county of Carlow, and in 1662 was nominated one of the commissioners from that parliament to the king. At this time he removed with his family to England; and having faithfully executed a secret commission to the bishop of Munster, with which he was entrusted in 1665, he was appointed in the following year resident at the court of Brussels, and raised by patent to the rank of a baronet. During the reign of Charles II. he was concerned in a variety of negotiations. After the peace of Breda, (July 10, 1667,) Sir William went over to Holland, and formed an intimate acquaintance and friendship with De Wit, a man frank and open, and of the same generous and enlarged sentiments with himself; and in consequence of the negotiations of these two able statesmen, a defensive alliance was concluded between Holland and England. Sweden acceded to the confederacy: and thus was formed the triple league, which was generally regarded with equal surprize and approbation. In the conduct of this business, Temple acquired great honour; but to all the compliments that were paid to him on the occasion, he modestly replied, that to remove things from their centre, or proper element, required force and labour; but that of themselves they eaily returned to it. The French monarch and the court of Spain were equally displeased; but in the treaty at Aix-la-Chapelle, where Temple appeared as ambassador extraordinary and mediator, on behalf of England, his address prevailed; the Spanish minister complied with the conditions proposed; and the peace between the contending powers was signed in May, 1668. In consequence of this event, Sir William was nominated ambassador to the States-General, and taking up his residence at the Hague in the month of August of this year, he maintained his intimacy with De Wit, and was also on familiar terms with William, prince of Orange, who had then attained the age of eighteen years. But this triple alliance was of short duration. The corruption and intrigues of the English court produced a recall of Temple in the year 1669, and when it was proposed to him to return and make way for a breach with Holland, he declined, much to his honour, engaging in hostilities against a country to which he was attached, and retired from public business to his seat at Sheen, near Richmond. Here he employed himself in the improvement of his mansion, and in the cultivation of his garden; and also in writing his "Observations on the United Provinces," and a part of his "Miscellanea." When the war with the Dutch became unpopular throughout the nation, and the court and its ministers were under a necessity of bringing it to a termination, Sir William Temple was called out of his retirement to negotiate with the Spanish minister in London: and when the separate peace with Holland was concluded, he was recalled in the next year, 1674, to undertake the office of ambassador to the States-General, for the purpose of negotiating a general peace. Before his acceptance of this office, he obtained an audience of the king, with a view of stating to his majesty the pernicious politics of the Cabal ministry, and the necessity of popular measures for regaining the confidence of the nation. The negotiations for peace were commenced at Nimeguen, whether he removed from the Hague in 1676; and during their slow progress, he availed himself of the opportunity thus afforded him for accomplishing the popular measure of the marriage of the prince of Orange to the duke of York's eldest daughter, which took place in 1677. On another occasion, when the French manifested their intention of retaining the Spanish towns, which were to be surrendered by treaty, Temple was dispatched to the Hague to concert effectual measures with the States for bringing the French to terms; and in seven days he concluded a treaty, July 1678, by which England was bound to declare war against the French if the towns were not evacuated within the interval of sixteen days; but so feeble and fluctuating were the English councils, that before the ratification of the projected treaty, peace was signed at Nimeguen, and France was secured in the possession of a great part of its conquests.

In 1679 Temple was recalled from the Hague, in order to be appointed one of the secretaries of state; but perceiving the violence of parties, and the prevalence of discontent, he recommended a council of thirty persons, which was to be composed, together with the ministers of the crown, of persons possessing influence and credit in both houses of parliament. But divisions occurred which prevented the salutary effects of such a measure. Projects of limitation or exclusion were the subjects of warm discussion in parliament.
To these measures Temple was adverse; and his last act in parliament, as member for the university of Cambridge, was to carry from the council the king's final answer to the address of the Commons, never to consent to the exclusion of his brother: other members had previously declined this disagreeable service. When the king, in January 1694, dissolved the parliament without the advice of his privy council, Temple boldly remonstrated against the measure; and at length, wearied with the faction and misgovernment which he had witnessed, he declined the offered return for the university to the new parliament, and retired to Shene, conveying from thence a message to the king, "that he would pass the rest of his life as good a subject as any in his kingdom, but would never more meddle with public affairs."

The king replied to the message, that he bore him no resentment; but his name was expunged from the council. The remainder of his life was spent in retirement and seclusion from all public business; and it is said, that he interfered to little in political matters, as not to know the design of the prince of Orange to engage in the expedition that terminated in the revolution, and to be the last person who gave credit to his landing. After James's abdication, however, he waited on the prince at Windsor, and presented to him his son. King William urged upon him the acceptance of the office of secretary of state; but he maintained his purpose of living in retirement. His son was appointed secretary at war; but in the week in which he assumed the office, he was seized with melancholy, and threw himself into the Thames. His reflection on this afflictive event was that which his Stoic philosophy alone could have dictated: "a wise man might dispose of himself, and render his life as short as he pleased." In his state of retirement, he admitted Swift to be his companion, as we have already mentioned under Swift's article. King William occasionally visited him, and confidentially confided him on several important affairs. In 1694, he lost his wife; andinking gradually under increasing infirmities, occasioned by repeated fits of the gout, his life was terminated at Moor park, in January 1698, in his 70th year. The greatest part of his fortune was bequeathed to the daughters of his unfortunate son by a French lady, under the express condition that they should not marry Frenchmen.

Sir William Temple ranks high as a statesman, and also as a patriot, who well understood and zealously purposed his country's interest. His foboles, without giving them a wordly appellation, were impatience with those to whom he disliked, warmth in dispute, and a share of vanity and conceit; but he was substantially, says his biographer, a worthy man in the various relations of life. To outward forms of religion he paid little regard; but his letter to the countess of Effex is no less pious than eloquent; so that we can scarcely admit the charge of atheism with which he is reproached by bishop Burnet. As a writer, he ranks among the most eminent and popular of his time. His "Observations upon the United Provinces of the Netherlands" were printed in 1672, and deferve the attention of the politician and philosopher; his "Miscellanies" are lively and entertaining, if not profound. His "Memoirs" elucidate the history of the times. His "Introduction to the History of England" was published in 1695. His "Letters," in 3 vols., which relate to public transactions, were published after his death by Swift. "All his William Temple's writings," says one of his biographers, "display much acquaintance both with books and men, and are entirely free from the licentiousness so prevalent in that age. Their style is negligent and incorrect, but agreeable, resembling that of easy and polite conversation." Hume's "Miscellaneous" vol. vii. 8vo.


Sir William Temple did not escape the lash of criticism, and such was his vanity or irritability, or perhaps a composition of both, that his indignation was roused, and he expressed himself in the following terms: "The critics are a race of scholars I am very little acquainted with; having always esteemed them but little brokers, who, having no flock of their own, let up and trade with that of other men, buying here and selling there, and commonly abusing both sides, to make out a little paltry gain, either of money or credit, for themselves, and care not at whole cost." In another place he says, "there is, I think, no sort of talent so despicable, as that of such common critics, who can at best pretend to value themselves by discovering the defaults of other men, rather than any worth or merit of their own—a sort of levelers, that will needs equal the black and richell of the country, not by improving their own estimate, but reducing those of their neighbours, and making them appear as mean and wretched as themselves."

TEMPLE, in Geography, a town of the province of Maine, in the county of Kennebec, containing 462 inhabitants.—Allo, a township of New Hampshire, in the county of Hillsborough, containing 941 inhabitants; 70 miles W. of Portsmouth.

TEMPLE, Lie, a town of France, in the department of the Lot and Garonne; 7 miles W. of Villeneuve d'Agem.

TEMPLEBOY, a bay on the N.E. coast of New Holland, to the S. of Cape Grenville.—Allo, a bay on the E. coast of Labrador. N. lat. 52° 25'; W. long. 55° 50'.

TEMPLEMORE, (i.e. the Great Church,) a post-town of the county of Tipperary, Ireland, where there was formerly held a fair for wool, which lapsed several days. It is 75 miles S.W. from Dublin.

TEMPLE PATRICK, (i.e. Patrick's Church,) a post-town of the county of Antrim, Ireland, on the river Sixmile-water; 4$ miles E. by S. from Antrim, on the road to Belfast.

TEMPLERS. See Templars.

TEMPLARS, in Anatomy. See Tempora.

TEMPLETON, in Geography, a town of America, in the state of Massachusetts, and county of Worcester, containing 1203 inhabitants.

TEMPLETONIA, in Botany, is dedicated by Mr. R. Brown, to the honour of John Templeton, esq. of Orange Grove, near Belfast, a gentleman whose inquiries have much enriched our knowledge of Irish plants, and whose name, more conspicuously often appears in the pages of the Flora Britannica and English Botany.—Brown in Ait. Hort. Kew. v. 4. 269.—Clubs and order, Diadelphus Decandria. Nat. Ord. Papilionaceae. Linn. Leguminosae, Jull.

Gen. Ch. Cal. Perianth inferior, of one leaf, fimple, bell-shaped, with five rather unequal segments in the limb, permanent. Cor. papilionaceous, of five petals. Standard elliptical, ascending, entire. Wings nearly the length of the standard, linear-oblong, obtuse, with a small tooth near the base at their upper edge. Keel a little shorter than the wings, oblong, slightly curved, of two half-ovate petals, cohering near the extremity, with short claws. Stam. Filaments ten, all combined into one tube for more than half their length, separate above, ascending, five alternate ones rather the shorter; anthers uniform, small, oblong, incun- bent. P. GERMEN filaked, linear-sawhaped; style saw- shaped, ascending; stigma capitulate. Peric. Legume filaked, linear-oblong, compressed, obliquely pointed, of one cell and two valves. Seeds eight or ten, oval, polished, the scar of each bordered with a prominent crest.

Efl. Ch. Calyx fimple, with five rather unequal teeth.

Temel.

1. T. retusa. Wedge-leaved Templetonia. Ait. n. 1. (Rafnia retusa; Venten. Malmaït. t. 53.) Gathered by Mr. Brown, on the south-west coast of New Holland, from whence seeds were sent to England by Mr. Peter Good, in 1803. This is a greenbough shrub, flowering in spring and summer. Stem about a yard high, with straight, angular, smooth, leafy branches. Leaves about an inch and half long, alternate, on short flaks, spreading, entire, emarginate, smooth. Stipulas in pairs, small, oval, deciduous. Flowers lateral, axillary, solitary, on simple flaks, which are rather shorter than the leaves. Calyx distillate of the imbricated appendages which make a principal part of the character of the neighbouring genus Scottia. (See that article.) Petals near an inch long, of a deep crimson. Legume two inches long, and half an inch broad, slightly thick where each seed is lodged.

TEMPLEUVE en Peuves, in Geography, a town of France, in the department of the North; 7 miles S.S.E. of Lille.

TEMLIN, a town of Germany, in the Ucker Mark of Brandenburg, situated between the Bodensee and Dolensee. In the year 1735, this place was totally consumed by fire, but has been rebuilt to very great advantage; its streets being now broad and straight, and its houses uniform, exclusive of a spacious market-place in it, which forms a regular quadangle, insomuch that at present it is one of the most beautiful towns in all the Mark. It carries on a very large trade in timber, which is greatly promoted by means of a canal, newly made. In 1826 it was taken by the French, under the duke of Berg; and the prince of Hohenloe, who had retired hither after the battle of Jena, was made prisoner; 15 miles S.W. of Prenzlau. N. lat. 53° 5'. E. long. 13° 34'.

TEMPLUM Sostati, the name of a kind of surgical bandage described by Galen. He also describes another, under the name of templum parum Apollonii Tyrii.

TEMPHO, Ital., time, or measure, in Music.

Tempo Ordinario, usual time.

Tempo di Cavatina, giving time. See Gavotta.

Tempo di Minuetto, minuet time.

A tempo, or à tempo primo, after a pause, or rallentando, or ad libitum, implies a return to the first time in which a movement is begun; and in recitative, where, in general, no time is kept, à tempo, in an accompanied recitative, implies a regular time.

TEMPOAL, in Geography, a town of Mexico, in the province of Guatleca; 50 miles S.E. of St. Yago de los Valles.

TEMPORA, in Anatomy, the anterior and lateral parts of the head, where the skull is covered by the temporal muscles: the temples in common language. See Cranium.

TEMPORAL, Temporalis, a term frequently used for secular. In which sense it stands opposed to ecclesiastical.

Pope Boniface wrote to Philip the Fair of France, that he was subject to him, both in spirituals and temporals. At present, all the doctors on this side the Alps own the supremacy of kings in temporals. See Action.

TEMPORALIS, Temporalis, in Anatomy, an epithet applied to various parts about the temples: these are a superficial, a mdle, and two deep-seated temporal arteries; a temporal bone on each side of the head; a temporal vein; a temporal muscle; and temporal nerves. See the respective articles.

TEMPORALITIES, or TEMPORALITIES, the temporal revenues of an ecclesiastic; particularly such lands, tenements, or lay-fees, tithes, &c. as have been annexed to bishops' fees by our kings, or other persons of high rank in the kingdom. See Revenue.

The temporalities of a bishop, &c. stand opposed to his spiritualities. See Vacation.

The canonists on the other side of the Alps, anciently gave the pope a power over the temporalities of kings. Yet pope Clement V. owned frankly, that his predecessor Boniface VIII. had exceeded the just bounds of his authority, in meddling with the temporalities of the king of France. Fervet.

TEMPORALIA Customs. See Customs and Vacation.

TEMPORALIA Resolutions. See Resolution.

TEMPORARY Fortification. See Fortification.

TEMPORARY Hours. See Hour.

TEMPORARIO, in the Italian Music, a species of a tempo, or à tempo giusto.

TEMPORALIA OS, in Anatomy, two bones of the cranium. See Cranium.

TEMPESCE, in Geography, a town of France, in the department of the Sehlei; 10 miles S.W. of Antwerp.

TEMPTATION, Tentation, in Theology, an inducement or solicitation to evil, whether arising from the world, the flesh, or the devil.

Our Saviour's temptation, previous to the commencement of his public ministry, has been a subject of discussion and controversy among learned divines.

The evangelical account of this transaction may be found in Matt. iv. 1—11. Mark, i. 12, 13. Luke, iv. 1—12. It has generally been supposed, that the evangelical history of our Lord's temptation is to be understood as a narrative of outward transactions: that the devil tempted Christ in person, appeared to him in a visible form, spoke to him with an audible voice, and removed him corporeally from one place to another; and it must be allowed that these suppositions are warranted by the literal interpretation of the history. Nevertheless, this interpretation is liable to a variety of objections. It is unsuitable to the fagacity and policy of the evil spirit. Why, it has been suggested, should the devil assume our blessed Lord at all, and what advantage could he expect to gain over him; more especially when he came to him in person, and appeared before him in a visible form, and under his own proper character, proposing and urging temptations which could proceed only from an evil being? In order to evade this difficulty, some writers, as archbishop Secker and Dr. Chandler, have conjectured that the devil appeared not as himself, but under the assumed resemblance of a good angel; and others have supposed that he appeared to Christ in the form of a man. But the history furnishes no ground for these conjectures, and they are equally inconsistent with the temptations themselves, considered in their own nature; nor can it be pretended that Christ was ignorant by whom the several temptations, and particularly the third of them, was proposed: for in his reply, he calls him Satan. Besides, this transaction, according to the literal interpretation of its history, was very ill calculated to promote either the honour of
of Christ, or the instruction and consolation of his disciples. This objection is strengthened, when we consider, that Christ must have yielded voluntarily to the mere motion and influence of the devil, and have been accessory to his own dishonour, danger, and temptation. His character must have been rather degraded than exalted. The temptations presented to Christ were such in their own nature as could not afford evidence or exercise of his obedience, nor of course suitable confusion or useful instruction to his followers, under real and powerful trials. Moreover, it has been objected to the common opinion, that it ascribes to the devil the performance of the greatst miracles, and of things not only preternatural, but absurd and impossible, for such we must regard his shewing Christ all the kingdoms of the world from an exceedingly high mountain, and which whatever constitutes the glory and grandeur of its kingdoms. If we are under a necessity of deviating from a literal, and of adopting a figurative interpretation of the tranfauction recorded in this history, we are warranted in doing by other influences of a similar kind, that occur in the sacred writings. These writings relate things as actually done, which nevertheless were only tranfaucted in a vision. Cates of this kind frequently occur in scripture; for which we might refer to Genesis, xxxii. 30. Hosea, i. and iii. Jeremiah, xxxii. xxxvii. Ezekiel, iii. iv. v. St. Paul calls his "being caught up into the third heaven" and "into Paradise, a vision and revelation of the Lord." (2 Cor. xii. 1-4.) In conformity to these general principles, some writers of eminence have proceeded in forming their judgment concerning the temptations of Christ; and constrained by such objections as we have already briefly stated, they have abandoned the opinion that these temptations are to be understood as outward transactions, inasmuch as the things themselves were improbable, and even impracticable in their own nature; and inasmuch as the real performance could answer no valuable purpose. Calvin allows, in his note on Matt. iv. 5, that several circumstances in this history agreed belfi to a vision; and the generality of later writers have admitted, that the devil's shewing to Christ all the kingdoms of the world, and all their glory, in a moment of time, was done by some fictitious scene, from a persuasion, that it could not be done in any other way. Hence it has been argued by others, that if one of the temptations were presented to Christ in vision only, why might not the others be presented to him in the same manner. Adverting to the history itself, it is alleged, that the text, instead of positively and expressly affirming that the temptation of Christ was a real outward tranfauction, contains clear intimations, and even direct affirmations of the contrary. Thus, in the passage relating to the exhibition of the kingdoms of the world, and all their glory, in one view, and in a single point of view, the evanglist is not speaking of the real fight of all these objects; but he must design to be understood of what was instantaneously exhibited to the mind. Other plain intimations occur, that Christ's temptation is not to be understood as an outward tranfauction; and it is alleged by the advocates of this opinion, that all the evanglist who have mentioned this affair, do, in express terms, affirm that it passed spiritually, and in vision, or that it was merely an ideal or mental representation.

Some of those biblical critics, who consider this history as a recital of visionary representations, maintain that these visions were framed by the devil, and that the temptations are to be ascribed to his immediate agency: thus denying the power of Satan over the body of Christ, and granting him a nobler empire, a sovereign influence over the mind. Some have indeed supposed that Christ's temptation was nothing more than a bare meditation of our Lord upon such trials as might possibly be proposed by the great tempter of mankind. But it is needless to make any observations on a view of the subject, which is altogether unsupported by the history.

Another opinion has been propounded by a very able writer, in favour of which he has adduced a variety of arguments, that have given satisfaction to many persons who have examined this subject. Mr. Farmer (in his Inquiry into the Nature and Design of Christ's Temptation in the Wilderness) represents our Lord's temptation as baffling him while he was under a prophetic vifion, of which the Spirit of God himself was the immediate and sole author. Accordingly he considers the temptation of Christ, neither as an outward tranfauction, nor diabolical delusion, but as a divine vifion. At the time when this event occurred, our Saviour was actually in the wilderness, and therefore when the evanglist says, that "Jesus was led up of the Spirit into the wilderness," or as our author more literally renders the words, "then was Jesus brought (or carried) into the wilderness by the Spirit," he intimates, that into a wilderness our Lord seemed to himself to be carried, or thither he was transported in vifion by a prophetic divine affluat. The predictions used by the other evanglist, Mark and Luke, are laid to confirm the explicit thus given of the language of St. Matthew. Upon the whole, the meaning of the evanglists will be, "Christ was brought into a wilderness (not merely under a divine direction, but) under the full influence of the prophetic Spirit, making suitable revelations to his mind, and giving him a view particularly of his future trials." And these trials are described as "temptations of the devil," on account of the particular mode of their being revealed, being couched under the figure of Satan coming to him, and urging temptations. Our author, proceeding to examine the proper intention of this prophetic vifion, observes, that the several scenes which it comprehends, though presented to Christ in the form, and capable of answering the end, of a present trial, were directly intended as a symbolical prediction and representation of the future difficulties of his office and ministry. The first scene in Christ's vifion was prophesyary, verving to disprove the present turn and temper of his mind; and also prophetically, having a reference to his future ministry, through the whole course of which he was prefigured with the same kind of temptations, and refit for them upon the same principles. This part of the vifion, therefore, conveyed this general intimation: "that Christ, though the Son of God, was to struggle with the afflicting hardships of hunger and thirst, and all the other evils of humanity, like the lowest of the sons of men; and that he was never to exert his divine power for his own personal relief, nor meet the most pressing difficulties, or for the supply of his most urgent occasions; but with resignation and faith to wait for the interposition of God in his favour." The second scene of this vifion was Jerusalem, the metropolis of Judea and the seat of power; it was the temple of Jerusalem, where the Jews expected the first appearance of their Messiah; it was the wing of the temple, the eastern front of it, which commanded a view of the worshippers below. From this eminence Christ is required to throw himself down, in a dependence upon the divine protection, that to his miraculous preservation might give evidence of his divine mission, and induce the numerous worshippers, who were eye-witnesses of it, to acknowledge him immediately as the Messiah, visibly descending from heaven, in a manner agreeable to the expectation of the Jews. Such was the propofal, and the temptation was powerful. The principle upon which he rejected it was, in its spirit and meaning, this: "the Scripture forbids us
to pray to God in what instances he shall exert his power; and as we are not to rush upon danger without a call, or in expectation of an extraordinary deliverance; so neither are we to dictate to divine wisdom what miracles shall be wrought for men's conviction. As this trial bore reference to his future ministry, we find that in exemplifying the principle now manifested, he never needlessly and unwarrantably exposed himself to danger; and then relied on a miraculous interposition of divine power for his rescue; but he was cautious in declining hazards; avoiding what might exasperate his enemies; and even enjoining silence with regard to his miracles, when the publication of them was likely to excite envy or popular communion, and to inflame their minds against him. In displaying the evidences of his divine mission, he still acted upon the same maxim, opening his commission, not at Jerusalem, but in Galilee. In order to avoid ostentation and offence, he kept himself as private as the object of his commission would allow; and instead of courting the favour of the opulent and powerful, he converted freely with all sorts of people. In many other instances which an attentive perusal of his history will furnish, his ministry will correspond to his prophetic vision, in which he was tempted to a public and ostentatious display of his miraculous powers. In the third scene, the proposal was instantaneously rejected, and not without a mixture of just indignation. Besides this trial of his temper, the scene before us pre-figured the temptation to which he would be exposed in the course of his future ministrations, during which he was called upon to prostitute himself, with all his miraculous endowments, to the service of Satan, for the sake of worldly honours, or for gratifying the mistaken expectations of the Jewish people. For a farther illustration of this subject, we must refer to the work already cited. See also archbishop Secker's, Dr. Clarke's, Dr. Chandler's, Mr. Maffon's Sermons, on this subject. Benson's History of the Life of Christ. Macknight's Truth of the Gospel History.

TEMPTATION, Tentatio, in our Ancient Law-books, is used for a trial, proof, or affair. "Tentatio panis fiat bis in anno," Chart. Edw. I. See ASSAY, &c.

TEMOOK, in Geography, a famous station in the Crimea, situated at the foot of a small mountain, near the northern embouchure of the Kuban. It now is a strong fort, for the purpose of supplying post-horses. In Monterey's time, who travelled this way in December 1711, it was a place of great importance. He describes it as considerable for its commerce in hides, caviare, loney, Circassian flaves, and horses. He supposes that its cattle flood where the ancients placed their "Petrusus;" and two eminences, he says, which are named "the point of the island," may have been their "Achilleum Promontorium." This, it is supposed, was the situation of Cimmerium. Pallas conjectures, that Temook may probably have been the "Cimbreus" of Strabo.

TEMS, Fr., time, in Music: as à contre temps, against time.

TEMSENA, in Geography, a province of Morocco, situated on the coast of the Atlantic, to the S. of Saléce. This province is rich and fertile, and abounds in excellent provisions, of various kinds. Its name seems intended to signify its fertility, and the purity of the climate. Temenza appears to be derived from the two Arabic words Tanam Sanbi, only a year; as if they should say, that to reside here only a year would be sufficient to infuse the sickly the return of their health, and, in fact, is the firm belief of the natives. Corn is very plentiful in this province; it is of a very excellent kind, and the ears frequently bear 70 grains, or more. In the forests is found a kind of cedar, called hazar, of a resinous smell; it is a hard and incorruptible wood, and the Moors employ it in building their houses.

This and the neighbouring provinces abound in horses and horned cattle; their flocks are numerous, and the cavalry of Temenza is the best appointed of the empire, excepting the Black troops of the emperor, called Abed Seedy Barbaree. The population of the districts of Temenza and Shawia is estimated at 1,160,000 persons. The males of Temenza and Shawia are a strong, robust race, of a copper colour; their women possess much beauty, and have highly expressive features; and the animation of the countenance is increased by the use of el kokol sickly, with which they tinge their eye-lashes and eye-brows. In these provinces they are fond of drying their hands and feet with a preparation of the herb hena, which gives them a beautiful orange-colour, and, in hot weather, imparts a pleasing coolness and softness to the hands, by preventing, in a considerable degree, the quickness of perspiration.


TENIUS, in Geography, a river of Sardinia, which runs into the sea, 4 miles E. of Caliello Arragone.

TENA, a town of South America, in the province of Quito; 15 miles S. of Archidona.

TENABLE, formed from the French tenir, and that from the Latin tenere, to hold, in the Military Art, something that may be defended, kept, and held, against assailants.

Tenable is little used, but with a negative: when a place is open on all sides, and its defences are all beaten down, it is no longer tenable. When the enemy has gained such an eminence, this post is not tenable.

TENACIOUS BODIES. See TENACITY.

TENACITY, in Natural Philosophy, that quality of bodies by which they sustain a considerable pressure, or force, without breaking. Mem. Acad. Berlin, 1745 p. 47. Tenacity is the opposite quality to fragility, or brittleness.

TENACULUM, in Surgery, an instrument used in amputation, for pulling out bleeding vessels that are to be tied by ligatures.

TENAGLIA, in Biography, a Roman composer, mentioned by Pietro della Valle, as having set the opera of "Clearco," for that city, about 1634. This seems to have been one of the first musical dramas performed at Rome in a public theatre.

TENAILLE, in Fortification, a kind of outwork, consisting of two parallel lines, with a front, in which is a re-entering angle. In strictness, that angle, and the faces which compose it, are the tenaille.

The tenaille is of two kinds; simple and double.

TENAILLE, Simple, or Simple, is a large outwork, consisting of two faces or sides, including a re-entering angle. See Plate V. Fortification, fig. 4. lit. d.

TENAILLE, Double, or Flanked, is a large outwork, consisting of two simple tenailles, or three faillans, and two re-entering angles. Fig. 21. lit. e.

The great defects of tenailles are, that they take up too much
much room, and on that account are advantageous to the enemy; that the re-entering angle is undefended; the height of the parapet hindering the firing down into it, so that the enemy can lodge there under cover; and the sides are not sufficiently flanked.

For these reasons, tenailles are now excluded out of fortifications by the belt engineers, and never made, but where there wants time to form a horn-work.

Tenaille of the Place, is the front of the place, comprehended between the points of two neighbouring baitions; including the curtain, the two flanks raised on the curtain, and the two sides of the baitions which face one another.

So that the tenaille, in this sense, is the name with what is otherwise called the face of a fortres.

Tenaille of the Ditch, is a low work raised before the curtain, in the middle of the fos or ditch; the parapet of which is only two or three feet higher than the level ground of the ravelin.

There are three different forts (Plate VII. Fortification, fig. 6). The first are those which are made in the direction of the lines of defence, leaving a passage of three toises between their extremities and the flanks of the baitions, and likewise another of two toises in the middle for a bridge of communication to the ravelin. The second (fig. 7.) are those whole faces are in the lines of defence, and fifteen toises long, besides the passage of three toises between them and the flanks of the baitions: their flanks are found by describing arcs from one shoulder of the tenaille as a centre through the other, on which are set off ten toises for the required flanks. The third fort (fig. 8.) comprehends those whole faces are sixteen toises, as in the second fort, and the flanks parallel to those of the baitions.

The use of tenailles, in general, is to defend the bottom of the ditch by a grazing fire, and likewise the level ground of the ravelin, and especially the ditch before the redoubt within the ravelin, which cannot be so conveniently defended from any other place. The first fort do not defend the ditch so well as the others, because they are too oblique a defence; but as they are not substantive to be enfiladed, M. Vauban has generally preferred them in the fortifying of places. Thoë of the second fort defend the ditch much better than the first, and add a low flank to those of the baitions; but as these flanks are liable to be enfiladed, they have not been much used. This defect, however, might be remedied, by making them so as to be covered by the extremities of the parapets of the opposite ravelins, or by some other work. Thoë of the third fort have the fame advantage with the second, and are subject to the same inconveniences; and, therefore, they may be used with the same precaution.

Tenailles are esteemed so necessary, that there is hardly any place fortified without them, and it is not without reason; for when the ditch is dry, the part behind the tenaille serves as a place of arms, from which the troops may fall, destroy the works of the enemy in the ditch, oppose their descent, and retire with safety; and the communication from the body of the place to the ravelin becomes easy and secure, which is a great advantage; for by that means the ravelin may make a much better defence, as it can be supplied with troops and necessaries at any time. And if the ditch is wet, they serve as harbours for boats, which may carry out armed men to oppose the palingage over the ditch whenever they please; and the communication from the tenailles to the ravelin becomes likewise much easier than it would be without them. Muller's Elem. of Fort, p. 34.

See Fortification.

The ram's-horn is a curved tenaille, raised in the fos before the flanks, and presenting its convexity to the covered way. This work seems preferable to either of the other tenailles, both on account of its simplicity, and the defence for which it is constructed.

Tenailions, are works constructed on each side of the ravelin, much like the lunettes: they differ, as one of the faces of a tenaille is in the direction of the ravelin, whereas that of the lunette is perpendicular to it.

Tenailles are constructed by producing the faces of the ravelin beyond the counter-scarp of the ditch, at a distance MN (Plate VII. Fortification, fig. 9.) of thirty toises, and taking on the counter-scarp of the great ditch fifteen toises from the re-entering angle p to q, and drawing N q; then q N M p will be the tenaille required; its pitch is twelve toises, or the same as that of the ravelin. Sometimes there is made a retired battery, in the front of the tenailions, as at A: this battery is ten toises from the front, to which it is parallel, and fifteen toises long. There are commonly intrenchments made in the tenailions, such as O; their parapets are parallel to the fronts M N, or rather perpendicular to the side N q, and bifeect the side q N; the ditch before this retrenchment is three toises, and there is a banquette before the parapet, next to the ditch, of about eight feet, called berm, serving to prevent the earth of the parapet (which seldom has any revetment) from falling into the ditch. The ravelin, before which tenailions are constructed, must have its faillant angle much greater than the former construction makes them; otherwise the faillant angles of the tenailions become too acute; for which reason the capital of this ravelin is made forty-five toises, and the faces terminate within three toises of the shoulders. Muller's Elem. Fort. p. 37.

A tenaille is a work capable of affording great defence to the besiegers; as at the siege of Lisse, in 1708, where the besiegers were twice or thrice drove out of a tenaille they had taken and retaken.

Tenala, in Geography, a town of Sweden, in the province of Nylund; 8 miles N.W. of Eklund.

Tenancy, a habitation, or house to live in, or a tenement or poffiition held of another.

Tenancy, Entire. See Entire.

Tenancy in Tail. See Fee-Tail.

Tenant, in Agriculture, a person holding land or other property of another, either by grant, lease, or otherwise. Tenants are of different kinds, according to the nature of the tenures by which they hold their lands; but, in this last respect, they properly belong to the business of the law. Tenants hold their lands or farms for very different lengths of time, in different districts, as from one year to twenty-one; but in many places they have no leases at all. The most common lengths of time are seven, nine, fourteen, nineteen, and twenty-one. Short leases are now becoming general, as those of seven, nine, and eleven years. Tenants now mostly pay all taxes, except that on property.

The proper choice of tenants is a matter of the greatest importance to the well-doing and continued prosperity and successe of all forts of landed property, of almost any that can be adopted; as where they are improperly provided, there can hardly anything go on in the manner which it ought to do; nor can there be the best fort of management, that the cafe will admit of, pursued. Many things will necessarily run into complete neglect, and ruinous flates of them be produced as the consequence, which might have been easily and wholly avoided, by more attention in the first selection of the tenants.

The writer of the Middlesex Agricultural Report, after inculcating the necessity and utility of tenants having good and
TENANT.

and properly regulated leaves of the lands which they hold, remarks, that the letting of farms to tenants at will, or from year to year, is a most unwise practice, and one which should by all means be avoided by the proprietors of landed estates; as such tenants, he contends, from the very nature of their tenures, are precluded from the possibility of making any improvements; while they have it in their power to ruin the lands they occupy and hold. Rapacious landlords, unskilful stewards, and yearly tenancy, it is continued, destroy the holders' or tenants' confidence, smother their thoughts of improvements, and, in short, make bad tenants, by forcing them to contrive some mode of occupying the lands, so as to be able to quit them, on receiving half a year's notice, with the least possible loss to themselves; and which can only be done, by keeping the soil continually in a poor state, to the evident great losses of the proprietors, the no less ones of the tenants, and the still more disadvantages of the community in general. See LEASE, LETTING OF FARMS, AND QUALIFICATIONS OF TENANTS.

The writer of the work on "Landed Property" has remarked that, on all large estates, there are certain established customs and usages to which the proprietors, as well as the tenants or occupiers, consider themselves mutually amenable, although no legal contracts may subsist between them; and that, even where imperfect leaves, or other legal agreements, exist, there is still, in general, much left for custom and usage to determine. These fixed regulations, though they may be imperfect, it is contended, should be strictly regarded by superintendents, until better ones are substituted in their place, not only for the sake of moral justice, but as setting an example of integrity and good faith to the tenants. Nothing of this sort should ever be broken through by those in the management of such properties; as tenants on all such are constantly to be met with ready enough to break their stipulated agreements, without such examples; and it must be extreme folly to induce the others who are well disposed to do the same. On the contrary, it is but common prudence to fulfil every covenant, agreement, and promise, which may have been made, with the most scrupulous exactness, even to the meanest cottager, in order to inspire proper confidence, and obviate much mischief.

And besides setting examples of these kinds before the tenants, they ought, it is supposed, to be liberalized in their minds, by good offices, and acts of kindness, which may be beneficial in various ways. A spirited improving tenant should be refused few reasonable demands; he should have advantages conferred on him, not merely as rewards for his labours in benefiting the lands, but as inducing other tenants to pursue similar plans, and to shew that good managers are noticed and distinguished.

The consequences of an inattention to these matters, which is too common in most parts of the country, are very prejudicial; as the refusal of requests which would equally benefit the estate and the tenant, the fluidly thwarting of the well-meaning intentions of the best tenants upon it, the ignorantly quarrelling with them about mere trifles, and the making no sort of difference between those who are improving and those who are ruining it, or perhaps the encouraging the latter, and opposing the former, must have effects of the worst kind, there can be no doubt. Such tenants as are capable of improving, are also capable of impoverishing; and when disgraced by improper treatment, will be sure to haras the lands they hold, and take the first chance they have of removing to farms under more rational management, to the great inconvenience and disadvantage of those which they held before.

It is observed in the Agricultural Survey of Gloucester-
himself ill used upon leaving it. For all under-draining properly done, and for new buildings that were necessary for the farm, the tenant ought to be allowed a reward proportionate to the number of years left than twenty he may have had the use of them. He should likewise receive an allowance for quick fences, and the planting of orchards, or of aquatic and other useful trees in proper places, on producing fair bills, with receipts to them, of the expenses; provided he leaves the estate without committing any wilful waste. The landlord who enters into such a covenant with his tenant, may reasonably expect to have his farm delivered back to him upon terms equally fair. If the tenant has committed any waste, he should be obliged to make good all damages. Now such mutual conditions would do away many absurd restrictions that are at present laid upon the tenant; as it would then be his interest not to injure the farm, because he must pay for all damages wantonly done; and the landlord would have no reason to check the farmer's experiments and improvements, which would be a great encouragement to both ingenuity and industry: for gentlemen's agents are very apt, from too anxious care of the estates, to restrict tenants in such a manner, that they are little better than a mill-horse, who can go over only a particular circle of ground. It has been known that an agreement was made to lay a certain quantity of lime on land, where, if the land had been the writer's, he would have given more money than the lime cost, that it might not be laid on. And sometimes, besides many other ingenious modes of culture, which the ignorance of whom of the steward obliges the farmer to follow, he is tied down to plough and sow crops of corn only four years in fix, and no turnips or clover. But the restricting a man from ploughing up grass-land without leave, is certainly, it is thought, proper, till the landlord sees what his new tenant makes of the land he does plough; but if he is industrious, and tills well, the writer would suffer him to plough every inch he chose: as, on good arable land, it will certainly make in future a difference of from one pound to three pounds an acre in rent to the landlord. The nature and situation of the farm are, however, to be well considered before this is done.

Alfo where the duration of the term is twenty-one years, it would, it is supposed, be very proper that, three years before the lease expires, he should be restricted in the rotation of his crops, $o$ as to leave the farm in a proper state to be profitable to the coming tenant. This would likewise give time for the tenant to fix himself elsewhere, if the landlord and he do not agree again, as well as for the landlord to make proper choice of a new tenant.

It is very common for tenants to live in a very poor way, and obtain little profit, from the want of introducing a proper system of husbandry upon their farms, as it is only this that can afford a full profit; therefore, the best methods of management his circumstances will afford should always be pursued.

There is a great variety of regulations and restrictions in regard to tenants, in respect to the times and manner of entering upon their farms, the extent and methods of breaking up and cropping the lands, the various improvements in draining, manuring, &c. the making of fences, the felling of hay and firaw, the defloping of the live-flock at the end of leaves, the occupying of buildings by new tenants, the felling of timber for repairs, and a vast number of other matters, many of which are owing to the particular situations and circumstances of the lands that are to be held by the tenants.

**Tenant, or Tenants, Tenency, in Law, one that holds or possesses lands and tenements of some lord or landlord, by any kind of right, either in free, for life, years, or at will.**

The term *tenant* is used with divers additions. Thus, tenant in dower, is the that possesses lands by virtue of her dower. Tenant per Statute-Merchant, he that holds lands forfeited to him by virtue of a statute. See **Statute-Merchant**. Tenant in Frank-Marrige, he that holds lands or tenements by virtue of a gift of them, made to him upon marriage, between him and his wife. See **Frank-Marriage**. Tenant by Courtesy, he that is admitted by the rod in court to lands in ancient demeine.

See **COPYHOLD.**

Tenant Paravail. See **PRAEVAIL.**

Tenant by Charter is he that holdeth by seofment in writing, or other deed. See **CHARTER,** and **FREEHOLD.**

Tenant in Capite, or Chief, holdeth of the king in right of his crown. See **CAPITE.**

Tenant of the King is he that holdeth of the person of the king.

Tenants, Joint, those who have equal right in lands or tenements, by virtue of one title. See **JOINT TENANTS.**

Tenants in Common, those who have equal right, but hold by divers titles. Tenant, Particular, he that holds only for his term. Tenant, Sole, is he who has no other joined with him. Tenant by Execution, is he who holds by virtue of an execution upon any statute, recognizance, &c.

Tenants, Customary. See **CUSTOMARY.**

Tenants, Terre. See **TENANTS, TERR.**

Tenant, Very. See **VERY.**

Anciently, there were also tenant by knights-service, tenant in burgage, tenant in socage, tenant in frank-fee, tenant in vil-lagen. And there are still tenant in free-folmle, tenant in fer-tail, tenant upon sufferance, &c.

Tenant in Tail after Possibility of Life extinct. See **TAIL.**

Tenant to the Precipice, in Law, is he again whom the writ of precipice is to be brought in finding out a recovery. Tenant, or Tenan, in Heraldry, is used for something that fullains, or holds up, the shield, or armoury; and is generally synonymous with the word **supporter.**

The difference which some authors make between the two is, that tenants are single, and supporters double, one placed on each side of the shield. But the proper distinction seems to conflict in this, that tenants are human figures, and supporters figures of beasts.

There are various forms of tenants, as well as of supporters, viz. angels, maids, religious, savages, Moors, &c. The first tenants, F. Menefrier observs., were trunks, or branches of trees; to which the efcutechons were fastened by straps and bullocks. Afterwards the knights were represented as holding their own efcutechons, which were either hung to their neck, or else they leaned on them.

The origin of tenants and supporters is, by many, referred to the ancient tournaments, in which the cavaliers had their arms borne by servants disguised like savages, Moors, fabulous deities, bears, lions, &c. See **SUPPORTER.**
TENARIUM, in *Ancient Geography.* See *T-enarium.*
*Tena-rus,* or *Tena-rus,* a mountain of the Peloponnese, in Laconia.

TENASSERIM, in *Geography.* See *Siam.*

TENATARI, in *Ancient Geography,* a people who inhabited that part of Germany which corresponds to the present bishopric of Munster.

TENBURY, in *Geography,* a market-town in the upper division of the hundred of Doddington, and county of Worcester, England, is situated on the western border of the county, separated from Shropshire by the river Teme, at the distance of 21 miles N.W. by W. from Worcester, and 134 miles in the same bearing from London. The manor of Tenbury, at, or soon after the Conquest, was held by Robert Fitz-Richard, who was lord of Richard's castle; his heir assumed the name of Say, in consequence of a marriage with the heiress of that family: the property past, by a succession of heiresses, through various families, to the Cowells, whose descendants are still the lords of it. The town is not very extensive, and standing low, is often subject to floods from the rapid river Teme. A remarkable instance occurred Nov. 17, 1779, when a great part of the church, with its organ and monuments, were destroyed. The parish of Tenbury is three miles and a half in length, by three and a quarter in breadth, and the year 1811 contained 308 houses, and 1562 inhabitants. In the chancel of the church is a curious monument, representing a child in armour, laid in a crofs-legged position. Cough, in his *Sepulchral Monuments,* mentions this figure, and attributes it to the fon of "John Sturmy, the crusader, who followed his father to the holy wars when under age."

Over the river, at the north end of the town, is a handsome stone bridge of six arches. A market is held here on Tuesdays, and there are three annual fairs. Great quantities of hops and apples are cultivated in the vicinity of the town, and consequently much cider is made here. The Leominster canal, coming near the town, affords ready communication for goods, cider, &c. to distant places.

About one mile and a half S.E. of Tenbury is Suttonparks, in the chapel of which are some old monuments of the Arundel family. Near this place is Kyre-Wyre, distinguished for its "tall and mighty oaks," and for a neat mansion belonging to the Pytt family.—Nair's *History,* &c. of Worcestershire, 2 vols. 8vo. *Beauties of England and Wales;* Worcestershire.

TENBY, a market and borough town in the hundred of Nabet, and county of Pembroke, South Wales, is situated on the shore of Cardmaurth bay, 10 miles E. from Pembroke, and 250 miles W. from London. It occupies a rocky promontory of considerable elevation, stretching over the sands in a footherly direction, and at high water is nearly inclosed by the sea. Here is a small but commodious harbour, skirted on the land-side by a bold amphitheatre of rocks and houses. Leland says, "Tinibigh town townith on a main rokke, but not veri hi, and the Seren Se fo gulfich in about hit, that at the ful ye almost the third part of the town is inclosed with water. The town is stronge wauellit and welle gatid, everi gate having his porticoll ex solidi ferro. But that gate that ledith to Caernarmond ward is mow femelde, as circuit without an embalstel but open rofd towr, after the facion of the salt gate of Pembroke. Without this gate is a preti saborbe. In the middes of the town is a faire paroche churich. The towne itselft lakith frenche water, wherefor utuentur importata." And again, "Ther is a sinus and a peere made for hyppes. The towne is very welthe by marheandye; but yt is not very bygge, having but one paroche churiche. One thing is to be marevelled at. There is no welle yt the towne, as yt is faide, wherby they be forced to seek their water at S. John's without the towne." The wall, which once surrounded the town, is yet in some places nearly entire. The principal improvement of these walls is ascribed to queen Elizabeth, in whose time Tenby was a flourishing place. The streets are now in general good, though, on account of the nature of the ground, in some places inconveniently narrow and deep. They contain a large proportion of very respectable houses, occupied by substantial tradesmen and merchants, or by persons of independent fortunes. The want of water was an inconvenience under which the town long laboured; but by the recommendation and exertions of Sir William Paxton, the town is now supplied, at a trifling charge, with an extinguish'd supply of this necessary article. Tenby is one of the contributory boroughs joined with Pembroke in the return of a representative to parliament. The corporation consists of a mayor, aldermen, and common-councillers, a chamberlain, town-clerk, two sheriffs or bailiffs, two sergeants at mace, and twelve constables. The town is divided into two districts, which are denominated the In-liberties, and the Out-liberties. The former division is subject to the jurisdiction of the magistrates of the borough; the latter to that of the county magistrates. The present extent of the town is not considerable, the number of houses being estimated, in the year 1811, at 265, and the population at 1176. It is apparent, however, from the number of ruined buildings and foundations to be seen in the outskirts, that formerly it must have spread over a larger space than it now occupies, and contained a much more numerous population. Two weekly markets are held on Wednesday and Saturday, and five fairs annually. Tenby seems to have derived its earliest importance from its fisheries. But when the country fell under the power of the Anglo-Norman invaders, and this district became inhabited by the Flemish settlers, its local advantages for commercial objects of greater consequence were seen and appreciated. The harbour was improved for the convenience of shipping, and the population of the town and its vicinity was engaged in a woollen manufacture on an extensive scale. The commercial spirit thus awakened, procured for the inhabitants numerous privileges and charters from their lords, and from successive monarchs. The importance of Tenby, however, has sunk far below its former rank; its manufactures have disappeared, and its chief trade at present is created by the coal raised in its neighbourhood, which is here shipped off for other parts of the coast, and for the English markets. The convenience which the town has lost in this respect seems likely to be compensated by its rapidly advancing reputation as a bathing-place. It possesses many natural attractions for visitors; and peculiar advantages in point of convenience have been recently provided. Among these, the forenoon bath must be alluded to the baths lately erected by Sir William Paxton; in which all accommodations for health and pleasure are combined. The church of Tenby is situated in the middle of the town; it is a spacious edifice, comprising a nave and two side aisles; at the west end is a large square tower, surmounted by a lofty spire. The monastic establishments of Tenby were an hospital, or free chapel of St. John the Baptist, a convent of Carmelit friars, founded in 1399, and called St. Mary's college, and an hospital or lazarette, dedicated to St. Mary Magdalen. Here was an ancient castle, of which there are yet considerable remains, though mostly in a very dilapidated state. The only portions now standing that indicate its former strength are a bafile and square tower: the rest of the buildings exhibit the air of a splendid mansion rather than ct
of a military fortress. The situation of this castle was admirably formed for defence: it occupied the extreme point of the promontory, and was secured by inaccessible rocks on every side, 'except that facing the town, which was strengthened by bold fortifications.

On the coast at Tenby are some inflated rocks of romantic appearance, which exhibit curious excavations. Some of them are accessible on foot at low water: this is the cape with the island of St. Catherine, off the Cañon Point, which in one direction has been perforated quite through by the repeated action of the tides. The principal of these islands is Caldey, situated about two miles from the main land. It is about a mile in length, and half a mile wide, and is elevated to comprise about six hundred acres of surface, of which nearly a third is in cultivation. Here was a priory, founded, as is supposed, by Robert, the son of Martin de Turribus. The tower of the priory church, surmounted by a stone spire, is yet standing, and many of the conventual buildings have been converted into offices, and attached to a handsome modern edifice.

Near the coast, to the eastward of Tenby, are several respectable gentlemen's residences, some of them of ancient date. Among these are Ciglety, formerly inhabited by the Canon family; Hen-Gaftell, (the old castle,) the property of Thomas Stokes, esq.; Merritton, the seat of Charles Swan, esq.; Bonville Court, an ancient mansion of the Bonvilles; and Eare Wear, now called Amroth Caile, the residence of Captain Ackland; and on the road from Narbeth is Begelly Hall, the seat of James Child, esq.—Beauties of England and Wales, vol. xvii. Pembrokehire, by T. Rees. Historical Tour through Pembrokehire, 4to. 1810, by R. Fenton, esq. Account of Tenby, illustrated with engravings, 4to. 1812, by Charles Norris, esq.

TENCE, a town of France, in the department of the Upper Loire; 12 miles S.E. of Montroult.

TENCH, in Ichthyology, the English name of the taria of the modern authors, the fullo and gnaphal of the ancients.

It is, according to the Arctedian and Linneus system, a species of the cyprinus, and is distinguished by Artedi by the name of the blackfish, mucous, or limy cyprinus (which fee), with the end of the tail even. See Tench Fishing.

TENCH'S ISLAND, in Geography, an island in the Pacific ocean, so called by Liet. Ball, commander of the Supply, returning from Norfolk Island to England in the year 1790. The island cannot be more than two miles in circumference: it is low, but entirely covered with trees, many of which are the cocoa-nut; there were likewise others of a large size. These trees reached to the margin of a very fine sandy beach, which entirely surrounds the island. A great number of canoes were lying on the beach; and, it is supposed, there can be less than a thousand inhabitants on the island. The natives who were in the canoes were stout and healthy-looking men; their skin was perfectly smooth, and free from any disorder: they were quite naked, and of a copper colour; their hair resembled that of the New Hollanders. Some of their beards reached as low as the navel, and there was an appearance of much art being used in forming them into long ringlets: so that it should seem as if the prevailing fashion on this island was that of keeping the beard well combed, curled, and oiled. Two or three of the men had something like a beard or bone suspended to a string, which was fastened round the neck. S. lat. 1° 53'. E. long. 170° 31'.

TENCOA, a town of Mexico, in the province of Hondo-USA, 110 miles W. of Comayagua. N. lat. 14° 48'. W. long. 96° 22'.

TENCZA, a town of Austrian Poland; 13 miles W. of Cracow.

TEND, in our Old Writers, seems to signify as much as tender, or offer; as to tend or traverse an avertment, &c.

TENDA, in Geography, a town of Africa, or rather several towns close together, the capital of a country of the same name, on the right bank of the Gambia, situated to the south-west of Bondou, and south-east of Wooly. N. lat. 13° 21'. W. long. 11° 55'.—Alto, a town of France, in the department of the Maritime Alps; late capital of a county to which it gave name, annexed to Piedmont, situated at the union of the Rona and Borgna. It has only one parish church, which is a beautiful structure, a castle walled round and flanked with towers, on a rock, which commands the environs of the town. In the 16th century, it came to the duke of Savoy. The foil is not fertile, being on all sides surrounded by the Alps; it yields, however, good pasturage and timber; the rivers also furnish the inhabitants with excellent trout; 22 miles N.E. of Nice.

TENDE, Col de, the most remarkable passage through the Maritime Alps. See ALPS.

TENDEBA, in Ancient Geography, a town of Alta Minor, in Caria.

TENDEBAR, in Geography, a town of Africa, in the kingdom of Kama. N. lat. 13° 15'. W. long. 15° 57'.

TENDER, in a legal sense, signifies as much as to offer, or endeavour, the performance of any thing, in order to save the penalty, or forfeiture, incurred by non-performance.

Thus, to tender rent, is to offer it at the time and place when and where it ought to have been paid; which will save the condition of that time, though the landlord refuse to accept it.

TENDER, in Sea Language, is a vessel attending on some other larger and more considerable one. It is employed in the king's service on various occasions; as to receive volunteers and impressed men, and to convey them to a distant place; to attend on ships of war or squadrons; and to carry intelligence or orders from one place to another, &c.

TENDER PLANTS, in Gardening and Agriculture, all such as are too delicate and tender in their nature and habits to stand, or be raised, grown, or produced in the climate of this country, without artificial protection or assistance, until they have been sufficiently inured to, and hardened, and habituated against the effects of it. It has indeed been observed by Sir Joseph Banks, in a paper containing some hints concerning the proper mode of raising plants of this kind to this climate, inferred in the first volume of the "Transactions of the Horticultural Society" of London, that, respectable and useful as every branch of the horticultural art certainly is, no one is more interesting to the public, or more likely to prove advantageous to those who may be so fortunate as to succeed in it, than that of raising plants, natives of warmer climates, to bear, without covering, the ungenial springs, the chilly summers, and the rigorous winters, by which, especially for some years past, we have been perpetually visited. Many attempts have it, is said, been made in this line; and several valuable shrubs, that used to be kept in our flowers, are now to be seen in the open gardens; there is, however, some reason, it is thought, to believe, that every one of these was originally the native of a cold climate, though introduced to us through the medium of a warm one; as the gold-tree, aucuba japonica, the mountain, parina frutescens, and several others, have been in our times.

In the case of annuals, however, it is thought probable that much has been done by our ancestors, and something by the present generation; but it must be remembered, it is said, that all that is required in the case of an annual, is to enable it to ripen its fruit in a comparatively cold summer, after which, we know that the hardiest fruit has no power to injure
injure the feed, though exposed in the open air to its severest influence; but a perennial has to encounter frosts with its buds and annual shoots, that have sometimes been so severe with us, as to rend asunder the trunks of our indigenous forest-trees, as stated by Miller.

It is suggested, as probable, that when, our principal food corn at present, did not bring its feed to perfection in this climate, until hardened to it by repeated sowings. A few years ago, some spring-wheat from Guzerat was, it is said, grown with barley in a cultivated field; it rose, reaped, and bloomed, with a healthy appearance, but many ears were, when ripe, wholly without corn, and few brought more than three or four grains to perfection.

In the year 1791, some feeds of zizania aquatica were, it is said, procured from Canada, and grown in a pond at Spring-Grove, near Hounslow; they grew, and produced three plants, which ripened their seeds; and those seeds vegetated in the succeeding spring, but the plants they produced were weak, slender, not half so tall as those of the first generation, and grew in the shallowest water only; but the seeds of these plants produced others the next year sufficiently stronger than their parents of the second year. In this manner the plants proceeded, springing up every year from the seeds of the preceding one, every year becoming visibly stronger and larger, and rising from deeper parts of the pond, until the year 1824, when several of the plants were, it is said, six feet in height, and the whole pond was in every part covered with them, as thick as wheat grows on a well-managed field.

Here, it is thought, we have an experiment which proves that an annual plant, scarcely able to endure the ungenial summer of this country, has become, in fourteen generations, as strong and as vigorous as our indigenous plants are, and as perfect in all its parts as in its native climate and situation.

It is suggested too in the above paper, that the settlement lately made at New Holland gives a large scope for experiments of this kind: many plants have been brought from thence which endure our climate with very little protection, and some of these arrive at puberty at an early period; we have already three, it is said, from the south point of Van Diemen’s island, where the climate cannot be wholly without frost; mimosa verticillata, encalyptus hirta and obliqua.

In contributing still further to the elucidation and accomplishment of this new, very useful, and important object of the above arts, the account which has been given by Dr. Macculloch, of some delicate plants which are cultivated in the open air in the island of Guernsey, with the hints on the means of naturalizing tender exotics, inserted in the first volume of the "Memoirs of the Caledonian Horticultural Society," may also be found highly useful and interesting.

It is certain, it is conceived, that neither the thermometric flats of a given country, nor any meteorological condition which we have yet been able to observe, is competent to explain the peculiar affection of plants for particular regions of the earth. The observations of M. Ramond, in the "Annales du Museum," which have been translated by Mr. Salisbury, shew this, it is said, in a striking point of view. From these we see the perplexering regularity with which certain plants affect peculiar elevations, apparently unconnected with the nature of the soil, but bearing a relation alone to particular states of the atmosphere, which we have no means of appreciating. Similar facts are familiar to botanists in our own country, in the very limited zones of elevation affected by our alpine plants.

Vol. XXXV.

It is stated farther, that an economical object which depends on this property of plants remains yet to be noticed. This, which is still more in our power, is probably of more consequence than either of those mentioned above; what is meant is the perfect naturalization of the vine. It is well known, that from many of the ordinary varieties cultivated in this country, we can always procure a crop of grapes, but not always a crop of ripe ones. From two or three of these, the chance of ripening out of doors is considerable; from many others, it is hopeless. It is not improbable, that by successive sowings of feeds, other varieties might be produced, fill more certain of ripening than those which succeed best with us, e.g. the Miller and the Swevertake. We should thus acquire possession of an article of cultivation of great importance, by which a useful addition would be made to the agricultural proceeds of land, in particular situations, and by which we should be enabled to fabricate wines of a quality sufficiently good to compete with those of foreign growth.

A still more important object is, it is thought, the perfect naturalization of the potato, an effect as yet but very partially obtained, notwithstanding the length of time during which this valuable root has been a subject of cultivation. It is certain that this imperfect naturalization has been the result of the common practice of propagating by the tubers, to the almost total neglect of the feeds. It is true that feeds have been occasionally grown, and new varieties thus produced, but the experiment has hitherto been always undertaken for the mere purpose of producing these varieties, without any regard to that much more important object, the production of a plant sufficiently hardy to bear at least the first frosts of winter. In the southern parts of our island, it is not a desideratum of much importance, it is said, as the tubers are in general fully formed before the plant is killed by the frost; but in the northern parts it is an object of great consequence, the plant being frequently killed long before the roots have attained maturity. In the Highlands of Scotland, in particular, where a frost will frequently occur early in September, the crop is often prematurely destroyed, and the uses of this vegetable are in consequence materially limited. It is plain, that it would be necessary to sow the feeds of successive generations many times before the requisite degree of hardiness could be expected, and that the proceeds would demand both patience and time. Yet if it should require more of these than we can expect from the ordinary cultivator, it is an experiment which we may at least recommend to those public bodies, which so laudably exert themselves in ameliorating the agriculture and horticulture of this country. The difficulty of procuring feeds for seedling plants, could doubtless, it is thought, be obviated, in some measure, by depriving the young plant of its tubers, and thus compelling it to direct its energies to the other and more common mode of propagation, with which nature has provided all plants.

The writer cannot, however, conclude the suggestions in respect to this object or speculation, without mentioning a formidable objection which stands in the way of our attempts to naturalize particular plants. In every case where the useful varieties have been the result of cultivation in a warmer climate from a bafe and ufeless parent, it is to be feared, it is said, that the proceeds followed in naturalization, would again throw the plant back to its original state. This objection applies, it is supposed, chiefly to those fruits, such as the peach, the apple, and the grape, which, in their present cultivated state, are almost entirely the produce of art. For this reason, it is not improbable, that all attempts to naturalize
TEN

ize the grape to a cold climate may fail; yet the trial de-

ferves, it is said, to be made. The cale does not apply
equally to the potatoe. The original plant appears to be
valuable, independent of any artificial character, and would
consequently admit of a change, tending even to some
degree of deterioration, before it was materially injured in
its properties.

TENDERING, a name given to the soft tops of deers
horns, when they begin to shoot forth.

TENDING, in See Language, denotes the movement by
which a ship turns or swings round her anchor in a tide-
way at the beginning of the flood or ebb. Thus, if the
flood lets suddenly, it is evident that the ship, unless when
moored head and stern, will fall into the line of the current,
turning her head to the forthward, and vice versa. This
transition from one situation to the other is called tending or
swinging. Falconer.

TENDINOSUM CENTRUM. See CENTRUM.

TENDON, TENDO, in Anatomy, the hard, infensible
cords, by means of which muscular fibres are attached to
bones. See MUSCLE, after the description of the muscular
system of animal life; and FIBROUS SYSTEM.

TENDO Achillis, the powerful tendon belonging to the
muscles of the calf of the leg, placed just above the heel; so
named in allusion to the table, in which Thetis is said to
have held her son, Achilles, by this part, when she dipped him
in the Styx. See GASTROCNEMIUS.

TENDON of Achilles, Ruptured. When the tendo Achillis
is unfortunately cut, or ruptured, as it may be in con-
sequence of a violent exertion, or spasm of the muscles,
of which it is a continuation, the use of the leg is imme-
diately lost; and unless the part be afterwards successfully
united, the patient must remain a cripple for life.

The ancient surgeons seem not to have been well ac-
quainted with the rupture of the tendo Achillis, which they
probably might mistake for a spasm, or some other com-
plaint. In cafes in which this part had been cut, they re-
commended approximating the separated portions, and
maintaining them in contact by means of a future.

When the ruptured tendo Achillis was afterwards better
understood, the plan which we have just now mentioned
was fulfilled continued, the integuments being divided for the purpofe
of bringing the tendon into view. But that such a painful
mode is altogether useless and wrong, it is scarcely necessary
for us at the present day to observe.

The superficial situation of the tendo Achillis always
makes the nature of the accident easy of discovery, and it is
only when there is a considerable degree of swelling (which
is very rare), that the cale can be at all difficult to under-
fand. When the tendon has been cut through, which is not
an ordinary thing, the division of the skin brings the ends of
the fines into view. When the tendon has been ruptured, the
patient hears a sound, like that of the snapp of a whip, at
the moment of the occurrence. In whatsoever way the part
has been divided, there is a sudden incapacity, or, at least,
fr an extreme difficulty of standing and walking. Hence
the patient falls down, and cannot get up again. Besides
these symptoms, there is a very palpable depression be-
tween the ends of the tendon, which depression is increased
when the foot is bent, and diminished, or even quite removed,
when the foot is extended. The patient can spontaneously
bend his foot, none of the flexor muscles being interceded.
The power of extending the foot is full possible, as the
peronei muscles, the tibialis posticus, and long flexors, re-
mains perfect, and may perform this motion. Œuvres Chi-
rurgicales de Defaut par Bichat, tom. 1.

The indications are to bring the ends of the divided part
together, and to keep them so, until they have become firmly
united. The first object is easily fulfilled by putting the
foot in a plane of complete extension; the second, namely,
that of keeping the ends of the tendon in contact, is more
difficult.

In order to have a right comprehension of the indications,
we should consider what keeps the ends of the tendon from
being in contact. The flexion of the foot has this effect on
the lower portion; the contraction of the gastrocnemius
and fasciæ on the upper one. The indications then are to
put the foot in an unalterable plane of extension, and to
counteract the action of the above muscles.

The action of the muscles may be opposed: 1. By keep-

ing these powers in a continual state of relaxation. For
this purpose, the leg must be kept half bent upon the thigh.
2. By applying methodical pressure to the muscles; me-

thodical, because it is to operate on the flaccid portion of
the muscles, and not on the tendon, the ends of which being
depressed by it, would be separated from each other, and,
instead of growing together, would unite to the adjacent
parts. The pressure should also operate so as to prevent
the ends of the tendon from inclining either to the right or
left.

This kind of pressure, which the bandage ought to make,
seems to have escaped the attention of all authors. Who
cannot fee, however, that the action of the muscles being by
this means resifted, the upper end of the tendon will not
have such a tendency to be drawn upward, and separated
from the lower one? Œuvres Chirurgicales de Defaut par
Bichat, tom. 1.

The famous Petit seems entitled to the honour of having
first devised the plan of treating the ruptured, or divided
tendo Achillis, by keeping the leg and foot in a particular
posture, with the aid of an apparatus. Seeing that the ex-
tension of the foot brought the ends of the tendon into con-
tact, it occurred to him that such extension should be main-
tained during the whole of the treatment, in order to bring
about a permanent union. This happy idea, the simplicity
of which should have rendered it obvious to all practitioners,
one having originated, became the common business, on which
have been founded all the numerous methods of cure, which
have been since recommended. Defaut par Bichat.

The celebrated Dr. Alexander Mono, professor of
anatomy at Edinburgh, happened to rupture his tendo
Achillis. When the accident took place, he heard a loud
crack, as if he had suddenly broken a nut with his heel, and
he experienced a sensation, as if the heel of his shoe had
made a hole in the floor. This sensation, he says, has also
been observed by others, though some have complained of
a smart stroke, like what would be produced by a flone or
cane. Immediately suspecting what had happened, the
doctor extended his left foot, in which the occurrence had
taken place, as strongly as he could with his right hand,
while with the left he pressed the muscles of the calf down-
ward, so as to bring the ends of the broken tendon as near
together as possible. In this position he sat, until two fur-
gous came to his assistance. They applied compresses, and
bent a board to the upper part of the foot, and fore part of the
leg, both which they kept, as nearly as possible, in a
straight line, by a tight bandage, made with a long roller.
But as this mode of dressing soon became very uneasy,
it was changed for the following one. A foot-fock or fliper
was made of double quilted ticking, from the heeh of which
a belt or strap projected, of sufficient length to come up over
the calf of the leg. A strong piece of the same materials
was prepared, of sufficient breadth to surround the calf, and
this was fastened with laccings. On the back part of this
was a buckle, through which the strap of the foot-loek was 
palled, so that the foot could be extended, and the calf 
brought down at pleasure. The leg and foot were wrap-
up in soft flannel, fumigated with benzoin, and the bandage 
was kept on day and night, the belt being made tighter when the 
doctor was about to go to sleep, and loosened 
when he was awake, and on his guard. For a fortnight he 
did not move his foot and leg at all, but was conveyed in a 
chair on canvas from one part of the room to another. 
Afer this he began to move the ankle-joint, but in such a 
gentle manner as not to give any pain. The degree of 
motion was gradually increased, as the tendon became ca-
Peable of bearing it, care being taken to flop, when the mo-
tion began to create uneafnes. The affected limb was 
moved in this way, for half an hour a t a time. In a few 
days, the hollow between the separated ends of the tendon 
became imperceptible, though the part continued soft much 
longer. It became, however, gradually thicker and harder, 
ntil a knot was at last formed in it, apparently of a carti-
laginous nature. Though this was at first as large as a mid-
ddling plum, and gradually became fottier and smaller, yet it 
did not disappear entirely. Having occasion to go out five 
weeks after the accident, the doctor put on a pair of shoes, 
with heels two inches high, and contrived a steel machine to 
keep his foot in the proper position. This machine, how-
ever, he afterwards changed for another, made of the fame 
materials as the former. It was not till five months after the 
accident, that he thought proper to lay aside all affifiance, 
and to put the strength of the tendon to a trial. See 
Monro's Works, p. 661.

It seems unnecessary to enumerate the various plans de-
vifed since the time of Petit. Suffice it to state, that both 
in a wound and rupture of the tendon Achilles, the ancient 
method of using a future, for keeping the ends of the ten-
don in contact, is at present quite exploded, and position of the 
limb is the grand agent by which the cure is now uni-
erally accomplished. The following was Default’s method, 
which, though it was expressly designed to fulfill all the 
above-mentioned indications, may not after all be a more 
valuable practifical plan, than the one adopted by Dr. 
Monro. After the ends of the tendon had been brought into contact, by moderate flexion of the knee, and complete 
extension of the foot, Default used to fill up the hollows on 
each side of the tendon with soft lint and compreffes. 
The roller applied to the limb made as much pressure on these 
compreffes as on the tendon, and hence this part could not 
be depressed too much against the subjacent parts. Default 
ext next took a compref, about two inches broad, and long 
enough to reach from the toes to the middle of the thigh, 
and placed it under the foot, over the back of the leg, and 
the lower part of the thigh. He then began to apply a few 
circles of a roller round the end of the foot, to as to fix the 
lower extremity of the longitudinal compreffes. After 
covering the whole foot with the roller, he used to make the 
bandage describe the figure of 8, palling it under the foot, 
and across the place where the tendon was ruptured, and the 
method was limifed by encircling the limb upward with the 
roller, as far as the upper end of the longitudinal compreffes. 
Default par Bichat.

Certainly this plan seems to answear every object, and may 
be worthy of being adopted in this country. The con-
tinued pressure on the muscles of the calf, by which their 
action is materially rehbled, is too much disregarded by the 
generality of English surgeons. Consult Monro's Works 
Encyclopédie Méthodique, article Achilles, tendon d’; and 
Mémoire sur la Division du Tendon d’Achille, in Œuvres Chi-
rurgicales de Default par Bichat, tom. i. p. 306. Cooper’s 
Dick. of Practical Surgery.

TENDONS, Shooting of the, Subsultus tendinum, in Medicine, a 
flight and repeated convulsive twitching of the muscles, 
which occurs in the latter stages of low fevers, and, as it 
indicates great debility, and a very morbid condition of the 
brain or common tenfiorium, it is usually reckoned among the 
dangerous symptoms of fever. See FEVER, and TYPHUS.

TENDON, in the Mange, a sort of gristle that surrounds 
one part of the horse’s foot, and is feated between the hoof 
and the coffin-bone, near the coronet. When a horse has a 
quitter-bone, the matter that gathers between the coffin-bone 
and the hoof spoils the tendon, and makes it black; and the 
cure of such a quilter-bone consists in cutting and extirpating 
the tendon.

TENDREMENT, Fr. in Music, tenderly, equal to con 
temperamente, Ital. See CON AFFETTO, and AFFETTUOSO.

TENDRIL, in Botany and Vegetable Phyfology. See 
CIRRHUS.

TENDUCCI, FERDINANDO, in Biography, an opera-
finger in soprano, born at Sienna, whence he at first assumed 
the name of Senefino, on account of the celebrity of a finger 
of that city, in the early part of the last century; though 
neither his voice nor figure of singing at all resembled that of 
the great finger and actor, Francesco Bernardo detto Se-
fenio, whose voice was a rich and full contralto, and in whole 
singing and acting there were more of grandeur and dignity 
than tendernefs and expression, which characterized Ten-
ducci’s figure; and whose voice was a high soprano of a clear 
silvery tone, which by great pains he had rendered very 
flexible; but he had formed himself more on Caffarelli’s 
figure than on that of Senefino.

He arrived in England, as second man, in 1758, when 
Pottenza was principal. The first notice he obtained was in 
a cantabile air, set by Caffarelli for himself, in the fine figure of 
grand pathetic, such as six years after, Mannzoli’s fine adagio 
in Ezio, “Ciro mio bene addio,” was composed in by 
Peccetti.

It was in 1759, during the reign of Cocchi’s “Ciro 
riconosciuto,” that he became a favourite of the public; for 
though a young performer, and only second in rank under 
Pottenza, he had a much better voice and manner of singing 
than the performer to whom he gave precedence.

In 1760 he went to Scotland, and we hear no more of 
him till 1763, when he returned to London, and performed 
the principal man’s part in Dr. Arne’s Artaxeres, of which 
the success was greatly owing to his talents.

At this period, Bach and Abel established a weekly sub-
scription concert in Hanover-square, which was better 
patronized and longer supported than perhaps any one had 
ever been in this country, having continued full twenty years 
without uninterrupted prosperity, at which, during the chief part 
of the time, Tenducci was the principal finger.

In 1772 he succeeded Guadagni as first man at the great 
opera, performing that year with the Grafi in “Coroep,” 
and the next year in “Semiramide riconosciuta.”

In 1764 he went to Ireland, where he and Mrs Brent 
performed together in Artaxeres.

In 1765 an Italian opera was performed in Dublin, in 
which he and the Cremonini sang principal parts in Mithri-
dates, in the principal cities of that country.

Some time after he returned to London, and was engaged 
at the opera, where, in 1785, he revived Gluck’s Orfeo.

Such is the outline of his professional career in public. 
The events of his private life are still more varied.

He had not been long in England before he was thrown 
into
into the king's bench for debt, where he emblazoned that residence by his talents, and amused its inhabitants. He was, however, allowed to attend evening concerts elsewhere, attended by a garde du corps. But on these occasions, a Jewish lady, his patroness, carried him in her carriage to the performance, and conducted him safe back with his attendant to his limited residence; where, during a part of the time, he had the honour of Dr. Smollett for his neighbour.

In Scotland he hung at the Edinburgh concerts, and gave lessons in singing; by which occupation he improved his own talents so much, that he returned to London a much better finger than when he left it. So true is the observation of Arizotile, that no art or science is well learned but by teaching, when it is necessary to give reasons for what in private practice is done mechanically.

In Ireland he married a lady of considerable fortune, who was enchanted by his talents.

In Italy, whether he carried this lady, he was unmarried, the laws of that country forbidding conjugal union to caftrati. And on his application to the pope for a dispensation, it was refused; though the petitioner said that his reason for marrying was, the operation in his youth not having been completely performed: "why then," says his holiness, "let he be done more effectually?" and he was obliged to separate himself from his tender spouse, and to console herself with a more efficient husband.

When he quitted the stage, he employed his whole time in teaching to sing; had many scholars, and a good method of instruction; giving to his pupils, in English, a set of axioms or rules of study and practice translated from the Italian, drawn up, as he said, by himself; but which, after his decease, were found in the Solferggi of April.

Notwithstanding the great number of his scholars, his income was insufficient to keep him out of debt, or even the king's bench, without the ingenious expedient of becoming a bankrupt, by which he defrauded all his creditors, and died insolvent, being, as has been reported, buried at the expense of his countrymen, who made a collection for that purpose at the Orange coffee-house. But from better authority, we have been informed that he died at Genoa.

Tenducci had much professional merit; but as to probity, honour, and ideas of right and wrong, they never seem to have extended further than convenience and personal safety.

TENDUNCULO, in Geography, a river of Africa, which runs into the Indian sea, S. lat. 19° 20'.

TENEA, in Ancient Geography, a town of Corinth, on the frontiers of Sicenia, S. of Epiceria. It pretended to derive its foundation from the Trojans made prisoners in the isle of Tenedos, and brought into this country by Agamemnon. Apollo was much honoured here.

TENEBRÆ, Darkness, in the Romish Church, a service performed on the Wednesday, Thursday, and Friday before Easter, in commemoration of the agony of our Saviour in the garden; and the darkness that overspread the earth at the time of his crucifixion.

TENEBRIO, in Entomology, a genus of the Coleoptera order of insects, the generic character of which is, that the antennae are moniliform, with the last joint rounded; the thorax plano-convex, margined; the head exerted, and wing-veins tibifil.

In the insects of this genus the body is oblong-oval, and in most species somewhat pointed at the extremity. Several species are also ditinct of wings. This is a numerous genus, and is divided by Fabricius and others into several distinct genera, under the appellations of Pimelia, Bleps, Aturmus, &c. In Gmelin's edition of Linnaeus it comprehends 63 species. The European species are denoted by an asterisk.

A. Six filiform Feelers; anterior legs formed for digging, palmate-dentated; including the Scaris of Fabricius and Pallar.

Species.

COMPLANATUS. Black, with a subquadrate thorax, and smooth shells or wing-veins of a large size. Found at Cayenne.

MARGINATUS. Black, with a subquadrate thorax; fulcated shells; blue margin. Found at Cayenne.

GIGANTUS. Black, with fulcated mandibles, and smooth shells. Found in Africa; nearly allied to the next species, but three times as large.

SUBTERRANEUS. Black, with the fore-part of the head fulcated, and frigate shells.

CYANEUS. Blue, very smooth; antennæ and feet black. Found in New Holland.

* Fossor. Pitchy. Found in sand-hills, which it perforates.

* CURSOR. Brown; oblong thorax; five angles denticated. Found as the former.

ARARUS. Black; serrated thorax; antennae and feet tassaceous. Found in the East.

MINUTUS. Black; thorax margined; antennæ elevated, and feet pitchy. Found in Sweden; and twice as large in Saxony.

COLLARIS. Black, with shells punctate-serrated, and head brown; antennæ and feet pitchy; the anterior spinous. Found at Berlin.

Bucephalus. Wholly brown, punctated; eyes black. Found in India.

B. With unequal filiform Feelers.

ATRATUS. Wholly black; smooth. Found in Egypt.

C. With four Feelers; the anterior subclavate; the posterior filiform; the Tenebrions of Fabricius, and Mylarides of Pallar.

LAMINATUS. Black; thorax subquadrate, smooth; shells fulcated; anterior legs incurvatur at the apex, and ferruginous lamina acute. Found in India; the largest of the genus.

GIGAS. Black; shell frigate; thorax smooth. Found in Surinam.

PUNCTATUS. Black; thorax quadrate; margin subdenticate; shells frigate-punctated. Found in India; of a large size.

SEYRATUS. Black, smooth; shells frigate; posterior legs frigate. Found in Sierra Leone.

* MOLYR. Wholly black; thighs anterior thicker; — an insect often seen in houses, one of the smaller kinds, proceeding from a larva commonly known by the name of mealworm, from its being so frequently found in flour, &c.; it is of a yellowish-white colour, about an inch long, slender-bodied, and of a highly polished surface, and is considered as the favourite food of the nightingale, in its captive state, and laid to remain two years before it changes into a chrysalis.

LURIDUS. Black, with brown feet. Found in Brazil.

CHALYBEUS. Violet, with feet and antennæ pitchy. Found in Guinea.

MAURITANICUS. Black, beneath pitchy; margins of the
<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>VARIEGATUS</td>
<td>Oblong, with varied brown and cinereous. Found in Africa.</td>
</tr>
<tr>
<td>ABBREVIATUS</td>
<td>Ovalate, black, with shell striated, and head tuberculated. Found in India.</td>
</tr>
<tr>
<td>CAPENSIS</td>
<td>Ovalate, black; shell striated; anterior legs dentated-filose. Found at the Cape of Good Hope.</td>
</tr>
<tr>
<td>CORNUXUS</td>
<td>The margins of the double-horned thorax crenated, and the angles projecting. Found in Smyrna.</td>
</tr>
<tr>
<td>SANGUINIPEX</td>
<td>Black, with antennae and feet fuscous. Found in New Holland.</td>
</tr>
<tr>
<td>BURSTOIDES</td>
<td>Black; oval, thorax marginated; the connate shells smooth. Found at the Cape of Good Hope.</td>
</tr>
<tr>
<td>DERMETOIDE</td>
<td>Black; thorax oval, marginated; shells striated. Found in Saxony.</td>
</tr>
<tr>
<td>CULINARIUS</td>
<td>Ferrugineous; shells striated; shield margined. Found in Spain and Sweden.</td>
</tr>
<tr>
<td>BARBARUS</td>
<td>Black, very smooth; thorax orbiculated; the shield of the head on the fore-part, with the margin elevated. Found in Mauritania.</td>
</tr>
<tr>
<td>* ERRATICUS*</td>
<td>Black; the antenna, suborbiculate thorax, and shells ferrugineous; brown at the apex.</td>
</tr>
<tr>
<td>PALLENS</td>
<td>Palely tesselate; thorax transverse. Found of a small fize at the Cape of Good Hope.</td>
</tr>
<tr>
<td>FERRUGINEUS</td>
<td>Ferrugineous, with shells striated tesselate. Found in Africa.</td>
</tr>
<tr>
<td>VILLOSUS</td>
<td>Brown, cinereous-villos, shells smooth and ferrugineous.</td>
</tr>
<tr>
<td>CARABOIDE</td>
<td>Black; thorax oval, marginated; shells striated.</td>
</tr>
<tr>
<td>BRUNNIPES</td>
<td>Black, smooth; shells striated; antennae and feet ferrugineous. Found at Drefden.</td>
</tr>
<tr>
<td>LEVIGATUS</td>
<td>Oblong, black, with smoothish shells. Found in Africa, of a left fize than the molitor.</td>
</tr>
<tr>
<td>GIBBOSUS</td>
<td>Subovate; wholly brassy, shells gibbous-convex; the very fine striae crenulated. Found in Brafil.</td>
</tr>
<tr>
<td>SPINIMANUS</td>
<td>Thorax marginated, smooth, shells very smooth; posterior oblique; fore-legs produced with a very strong arched spine. Found in Southern Russia.</td>
</tr>
<tr>
<td>UNCINUS</td>
<td>Apterous, black; thorax marginated, subequal; shells striated-punctated and angular; wings anterior, clevated, very large, biuncinate. Found in Spain.</td>
</tr>
<tr>
<td>PICEUS</td>
<td>Deprefated, black; beneath pitchy; shells striated. Found in Saxony.</td>
</tr>
<tr>
<td>CYLINDRICUS</td>
<td>Very black; thorax with elevated points; antennae brown; the tarsi beneath yellow-hairied. Found at Berlin.</td>
</tr>
<tr>
<td>MONTANUS</td>
<td>Wholly black; shells opaque. Found in Hungary.</td>
</tr>
<tr>
<td>TRISTIS</td>
<td>Black, sub-opaque, varied with excavated points. Found in Carniola.</td>
</tr>
<tr>
<td>POMONE</td>
<td>Above pitchy, beneath black; shells with five elevated strize. Found in Carniola.</td>
</tr>
<tr>
<td>CAPREEL</td>
<td>Black; points impressed on the thorax and shells tesselate. Found in Carniola and Switzerland.</td>
</tr>
<tr>
<td>FLAVUS</td>
<td>Yellow, with black eyes. Found in Carniola.</td>
</tr>
<tr>
<td>AESTITUS</td>
<td>Black; feelers and feet yellow. Found in Denmark.</td>
</tr>
<tr>
<td>STRIATUS</td>
<td>Black; the abdomen beneath densely striated. Found in Denmark.</td>
</tr>
<tr>
<td>FESTINANS</td>
<td>Wholly black, smooth; thorax ferrugineous.</td>
</tr>
<tr>
<td>GLOBOSUS</td>
<td>Black; thorax globose; two rough lines elevated. Found in Siberia.</td>
</tr>
<tr>
<td>INCURVATUS</td>
<td>Wholly pitchy; shells striated across the middle. As the last.</td>
</tr>
<tr>
<td>OVA NUS</td>
<td>Ovalate, blackish-brown; shells with eight strize, smooth.</td>
</tr>
<tr>
<td>ROSTRATUM</td>
<td>Black, wholly smooth; the coleoptera rotundata.</td>
</tr>
<tr>
<td>SURVIVULOS</td>
<td>Wholly ferrugineous, subfuscile.</td>
</tr>
<tr>
<td>GLABRER</td>
<td>Wholly ferrugineous, smooth. The four last found in France.</td>
</tr>
<tr>
<td>* LUNarius</td>
<td>Thorax with two cavities; shells violet or red; antennae and feet ferrugineous.</td>
</tr>
<tr>
<td>LARDARIUS</td>
<td>Ovulate, yellow-fuscile; eyes black; shells with punctated striae. Found in Belgium.</td>
</tr>
<tr>
<td>CURVATUM</td>
<td>Ovalate, pitchy; shells punctated-Astrate; thighs crenated; the hinder beneath crenated.</td>
</tr>
<tr>
<td>BICOLOR</td>
<td>Ovalate; shells striated; above black; the antennae; beneath and feet ferrugineous.</td>
</tr>
<tr>
<td>ATHERIS</td>
<td>Black; antennae ferrugineous.</td>
</tr>
<tr>
<td>LUNATUS</td>
<td>Black; depressed thorax-lunate; shells striated; feet ferrugineous.</td>
</tr>
<tr>
<td>HISPIDUS</td>
<td>Black, rough; shells striated; a spot at the base on both sides red; the antennae and legs red.</td>
</tr>
<tr>
<td>GLABER</td>
<td>Ferrugineous; head and thorax smooth, and shells black; these striated; mouth ferrugineous; feet livid.</td>
</tr>
<tr>
<td>TENEBRIO</td>
<td>Mortifagus, a species of the Pimelia, (which see,) in the Gmelinian edition of the Linsean system, thus described by Dr. Shaw. It is a coal-black insect, measuring about an inch in length, of rather slow motion, and distinguished by the remarkably pointed appearance of the wing-sheaths, which at their extremities project a little beyond the abdomen; they are also perfectly connate or undivided, forming a complete covering to the body, and being carried over the sides to some distance beneath, and the insect is totally destitute of real or under wings. It is usually found in dark neglected places, beneath boards, in cellars, &amp;c. and if handled, especially if crushed, diffuses a very unpleasant smell.</td>
</tr>
<tr>
<td>TENVIRIUM</td>
<td>In Ancient Geography, a promontory of Spain, belonging to the Iberians. Tefl. It lay S of the mouth of the river Iberus.</td>
</tr>
<tr>
<td>TENEDOS</td>
<td>In Geography, an island of the Grecian Archipelago, near the coast of Asia, and very near the Troad. This island has been incessantly celebrated by Homer and Virgil. The latter thus describes it:</td>
</tr>
</tbody>
</table>

> "Eft in confpectu Tenedos, nonstima fami
Infula, dives opum, Priamui duum regna manebant;
Nunc tantum fium et sitato malicida carinis."

According to Diodorus Siculus, it had anciently been called Locrophus; but when Tenes or Tennes built a town upon it, he called it Tenedos. Dohacht, however, derives its name from the Phrygian word Tin-edum, red clay, which was found here, and used for making earthen-ware. Paunianus says, that this island, which was situated within fight of the city of Troy, became miserable after the capture of the city, and was obliged to surrender to its neighbours, who had built Alexandria upon the ruins of Troy. It was one of the first conquests of the Periains, who made themselves masters of it, after having defeated the Ionians at the isle of Lada. It took part with the Athenians against the Lacedemonians, when an admiral of the latter people ravaged it, and drew from it contributions. The Romans had possession of it, and Verres pillaged the temple, and carried away the statue of Tenees, the supposed founder of the town. Strabo represents it as 24 stadia in circumference, and places it at the distance of 11 stadia from the continent; but Phyll states this distance to be 12 miles. Olivier computes the distance to be nearly 3000 toises; and he says, that the town is at the distance of about five leagues from
from the entrance of the Hellepont. This position has always rendered Tenedos important. Vessels bound to Constaninople find shelter in the ports of this island, or safe anchorage in the roads, when the winds are contrary and the weather bad. The emperor Julianus established in this island a magazine for receiving cargoes of corn transported from Egypt, 180 feet long, 90 broad, and proportionally high. During the troubles of the Greek empire, Tenedos sustained many vicissitudes. It was for many years a place of rendezvous for pirates. Scantily peopled and ill defended, it passed betimes under the Ottoman domination. The caliph Othman feized it in the year 1302, and in the possession of it, he was enabled to subdue the other isles of the Archipelago. During the minority of Mahomet IV. the Venetians retook it after the complete defeat of the Turkish fleet in the strait by the admiral Mocenigo, in 1656; but in the following year, the admiral having been killed in a second engagement, the Venetian fleet retired, and this island fell again under the power of the Turks, who have preferred it without interruption till the present day. The harbour is small, and can only receive merchant vessels: it is formed by a jetty even with the water's edge, and a tongue of land, on which is constructed the citadel that defends the entrance, and can at most secure it against being surprized by a privateer. The town is built in form of a semicircle, in a valley, and on the declivity of two hills: its population is from 5000 to 6000 souls, judging from its extent, and from the number of persons who pay the karachi. Its inhabitants, who are Turks and Greeks in equal numbers, are almost all occupied in the culture of the lands, few of them being mariners. The island is under the administration of a waivode or governor, an aga commander of the citadel, and a cadi or judge. The defenders of the town are 200 or 300 janizaries. The town is commanded by a pyramidal mountain of small elevation, that seems to have been formed by the action of a volcano, the traces of which are discoverable. In the environs is found a granite remarkable for pieces, of various sizes, of selflar crystallized. On the right of the mountain, in passing from the town towards the W., is a sandy plain, far from fertile, and almost entirely covered with vines. The hills, in general, are naked, dry, and little susceptible of culture. Those on the south of the town are calcareous; and the rock is more or less chalky and loaded with sea-shells.

Tenedos produces little corn, fruit, or herbage. The vine is the only article of wealth of this country, and its culture the principal occupation of the inhabitants. Muscadel wine is made in considerable quantities. From Tenedos are annually exported upwards of 600,000 oeks of wine, producing to the farmer more than 50,000 piastres. This wine paffes to Constaninople, Smyrna, and Raffia. This island also exports a small quantity of brandy. The climate of Tenedos is more temperate than that of the Dardanelles: it seldom freezes here, and the summer heats are moderated by the N.N.E. wind, which blows regularly during the day. The houffes have terraces of flat roofs. The Greek inhabitants are less gay than those of the other island: in the streets they are silent and melancholy, avoiding through fear the attention of the Turks; but when they can indulge themselves in mirth without danger, they surrender themselves to a sort of extravagant joy and delirium. The coast of Troy is frequently the theatre of their orgies and the field of their pleasures: thither they repair on the occasion of a wedding or of a festival, and there, under the shade of a plane-tree or oak, they pass the whole day in dancing, singing, eating and drinking. The females, however, are kept within the bounds of decorum, and might be compared, from their features and their shape, to the most beautiful models which antiquity has transmitted to us. N. lat. 39° 53'. E. long. 26°. Sonnnini. Olivier.

TENELLA, in Ancient Myths. As some conquerors at the Olympic games were not so fortunate as to have poets for their friends, or so rich as to be able to purchase odes on their particular victories, which were rated very high by bards of the first class; in honour of such, the old hymn to Hercules, of Archilochus, was sung by the friends of the conquerors only, if they could not afford to engage a band of professed musicians. The scholiast on Pindar's ninth Olympic tells us, that to supply the want of a cithara, Archilochus framed a word in imitation of the sound of a cithara, which word (Tenella, Τενέλλα), when there happened to be no musician present, the leader of the chorus chanted forth, and was answered by the rest of the chorus, in the words of the hymn, Ο Καλλακτεινομένη, Σφυφιί, O glorius Victor, hail! at every comma, or pause of which, this burden was again repeated.

TENENBER, in Geography, an island in the East Indian sea, 12 miles long and 3 broad. S. lat. 6° 50'. E. long. 122° 45'.

TENEMENT, Tenancy, in Laws, a house or lands, depending on a manor, or lordship; or a fee, or farm held of a superior lord, and which he may recall, when the term or condition is expired.

TENEMENT, Frank, is any lands, house, office, or the like, in which a man has estate for life, or in fee.

TENEMENT, Base, is where a man holds lands, &c. at the will of the lord.

Yet Kitchin, Briton, &c. make frank tenement and bare tenement opposites; on which footing, frank tenement should be where the tenant is at liberty to quit it when he pleases.

TENEMENTARY LANDS, among our ancestors, were the outlands of manors, which the Saxon thanes, or nobles, let out to tenants under arbitrary rents and services.

TENEMENTIS LEGATIS, in Laws, a writ which lies in London, and other places, where the custom is to devise tenements by half will as well as personal goods and chattels, for the hearing of any cause relating to them.

TENEN, or Knix, in Geography, a town of Dalmatia, situated on the borders of Botina, and the fee of a bishop; 48 miles S. of Bihace.

TENENDUM, in Laws, a clauze in a deed, in which the tenure of the land is created and limited. The office of a tenendum is to limit and appoint the tenure to the land which is held, and how, and of whom it is held. The tenendum seems now to be incorporated with the habendum, for we say, to have and to hold, in which clause the estate is limited, &c.

TENENTES NATIVI. See NATIVI.

TENTENIBUS in Affisa non Onerandum, in Laws, a writ which lies for him to whom a defferar has made over land, of which he deffered another; requiring that he be not disturbed in affise, for the damages awarded, if the defferar have wherewithal to satisfy them.

TENERETZA, tender, cares, feeling, equivalent to the French term tendrement.

TENERIA, in Geography, a town of the island of Cuba; 45 miles N.W. of Villa del Principe.

TENERIFFE, one of the Canary islands, the second in dignity, but the first probably with regard to wealth and fertility. It is about 70 miles in length, and its mean breadth is about 22 miles: its surface contains 1540 square miles, having, at an average, about 45 persons to the square mile.
The number of acres is 985,600, which, upon an average, allot about 10 acres to every individual in it; the number of inhabitants being calculated to be nearly 100,000. Of these there is annually a considerable migration to the Spanish colonies in South America. The poor of Teneriffe are easily persuaded to migrate, as the proprietors of the land do not give them sufficient employment throughout the year; and they have not the resources of manufacturers, except a trifling one in silk, chiefly stockings. The price of labour is under a shilling a day; and, beside corn and roots, the principal food of the common people is confined to cod-fish, caught on the neighbouring coast of Africa, or imported from North America. This island was formerly called Nivaria, which appellation it derived from the circle of snow that surrounded the peak of Tenda, now called the peak of Teneriffe; which name was given to it, as it is said, by the inhabitants of Palma island, in whose language tener signifies snow, and efe, a mountain. The figure of this island is triangular, as it extends into three capes, the nearest being about 80 leagues or more from the coast of Africa. The historical celebrity of this island has been very much owing to its peak, elevated to a considerable height from a base lying a little to the S.W. of its centre. Of its height we have various statements by different writers, who have ascended to its summit. Dr. Heberden, whose observations in ascending it are published in the Phil. Trans. vol. xlvii., makes its height above the level of the sea to be 2566 fathoms, or 15,396 English feet; and he says that this measure was confirmed by two subsequent observations by himself, and another made by Mr. Crofte, the consul. Nevertheless, chevalier de Bordia, who measured the height of this mountain in August 1776, makes it to be only 1931 French toises, or 12,340 English feet. Mr. Johnston, a merchant of Madeira, being on board ship in the offing of Orotava, took the angles made by a line from the horizon to the summit of the Peak, at two different spots, and measuring the distance between them by the log, determined the perpendicular height of the Peak to be 2023 English fathoms, being nearly the same as Chev. de Bordia had calculated from a base measured upon land. From the comparative observations of Mons. de Bordia's barometers, upon the Peak, and by the sea-fide, the mountain's height came within two fathoms of the geometrical measurement. The Hon. Grey Bennet, who made a journey to the top of the Peak in 1810, states its height to be about 12,500 feet. M. de Lemanon and Monges, on the 26th of August 1785, ascended the Peak, and stating its elevation above the level of the sea to be near 1000 toises, made some chemical experiments, in order to compare the phenomena at that height with those which occur in our laboratories. They observe, that the crater of the Peak is a perfect folettaria or laboratory of sulphur; its diameter being about 50 toises by 40, rilling with a steep and rapid ascents from W. to E. On the edges of the crater, and particularly towards the lowest part, are several apertures or vents, exhaling watery and sulphuric acid vapours, the heat of which raised the thermometer from 90° to 34°. The interior of the crater is covered with yellow, red, and white clay, and fragments of lava partly decomposed. Under these were found beautiful crystals of sulphur, forming rhomboidal octahedra, some of which were an inch thick. The flame exhaled from the apertures was pure water, not at all acid. The evaporation of liquids, and the cold thus produced, were very considerable. The action of the acids on metals, earths, and alkalies was slow, and the bubbles that escaped during the effervescence were much larger than usual. The production of vitriols afforded a singular phenomenon. That of iron instantly assumed a fine violet colour, and that of copper precipitated with a very vivid hue. The smell and strength of liquors appeared not to have lost any thing at this elevation, and the volatile alkali, ether, and alcohol, retained the same strength. Several experiments were made with a view of ascertaining the nature of the vapours exhaled from the crater, and whether they contained inflammable air, fixed air, or marine acid. From these he concluded that no fixed air exhaled from the crater, and also that the atmospheric air reifying upon it contains very little, and that the inflammable vapours and sulphuric acid gas alone are considerable, and indeed perceivable. The atmospheric electricity was considerable and positive. Many new varieties of volcanic ochors were discovered. See La Perouze's Voyage, vol. ii. p. 226, &c.

Dr. Heberden gave sir Joseph Banks some salt which he collected on the top of the mountain, where it is found in large quantities, and which he supposed to be the true nitrum, or nitrum, of the ancients. Although the vortex appears sharp, and of the exact resemblance of a cone, yet it is flat for the extent of an acre of ground, in the centre of which is a dreadful volcano, which frequently breaks out into flames, so violent as to shake the whole island with an incredible force. Smoke constantly issues from the mountain, near its summit, but no eruption has occurred since the year 1754, when the port of Garrachica was destroyed, and the harbour filled by the lava. The island of Teneriffe is divided in the middle by a ridge of mountains, which have been compared to the roof of a church, the Peak forming the spire or fleeple in the centre. An author well acquainted with the island says, that if you divide it into twelve parts, ten of these consist of rocks, woody and inaccessible mountains and vineyards; and yet, from the small remainder of arable ground, he has seen 250,000 hanches of wheat, besides immense quantities of yew and barley, produced. The greatest part of the island is volcanic, and all its rocks are lava. Mr. Bennet (Trans. of the Geological Society, vol. ii.) conceives, that formerly a very large crater, 12 miles in diameter, existed, the sides of which, under the name of Los Foldias, may be still traced a great way. The crater at the top of the Peak is but small, and somewhat in activity. The lavas vary in their appearance: some are composed of hornblende and felspath, without any foreign body; these are porphyritic: some are composed of green-flone, and contain olivin, augite, and zeolites: some are basaltic: these decompose the founet, and confitute the most fertile soil: there are also pumice in abundance, tufa ashes, and a lava resembling obsidian. Every circumstance, it is said, argued in favour of a volcanic formation, except the form of the mountains, whose irregular ridges, declivities, and acesuits, appeared very different from those exhibited by volcanic mountains. In the plain beyond Laguna, on the Orotava fide, the soil was not in the least volcanic, but composed of fine mould, or virgin earth; a mixture of clay, vegetable earth, and sand. Hollows, 30 feet deep, left dry by riverlets, exhibit no volcanic appearance. Immediately under the superficial soil was a layer of deep loam, next, one of tough clay, and all below was an irregular mixture of clay and sand. Elsewhere the hills consisted of indurated clay, and clay and iron, without any marks of the action of fire. In the whole island, there is no pure flint or scint-flone. Its mountains are of two sorts: one, evidently volcanic; the other, primary and composed of indurated clay, or of clay and calx of iron. In the low plains are layers of loose and soft argillaceous earth. (See Dr. Gillan's remarks in the 1st vol. of the Emburry to China, p. 118—120.) Although the people live on scanty and coarse fare, they are not much subject to disease, and instances of longevity, even to 100 years,
years, are said not to be rare amongst them. The air is dry and pure. The variations of the thermometer seldom exceed 14°, from 68° to 82°, in the inhabited part of the island. (See Gua-"iches.) To the eastward of Santa Cruz, says Mr. Ander-son (Cook's Third Voyage, vol. i. p. 22. &c.) the island appears perfectly barren. Ridges of hills run towards the sea, between which ridges are deep vallies, terminating at mountains or hills that run across and are higher than the former. Those that run towards the sea are marked by impressions on their fides, which make them appear as a succession of conic hills, with their tops very rugged. The higher ones that run across are more uniform in their appearance. The basis of the hills is a heavy, compact, blueifh stone, mixed with some shining particles; and on the surface, large mafles of red friable earth, or stone, are flattered about. The little earth, that appeared here and there, was a blackifh mould. There were likewise some pieces of flag, one of which, from its weight, and smooth surface, seemed almost wholly metalline. The mouldering state of these hills is, without doubt, owing to the perpetual action of the fun, which calcines their surface. “After walking about three miles,” says Mr. Ander-son, “I found no alteration in the appearance of the lower hills, which produce great quantities of the euphorbia Canaries. I met with nothing else growing there, but two or three small shrubs, and a few fig-trees near the bottom of the valley. Mott of the laborious work in this island is performed by mules, horfes being to appearance scarce, and chiefly referved for the use of the officers; they are of a small size, but well shaped and spirited. Oxen are also employed to drag their cafts along, upon a large clumsy piece of wood. In my walks and excursions I saw fome hawks, parrots, which are natives of the island, the sea-fowl or tern, sea-gulls, par-tridges, wagtails, swallows, martins, blackbirds, and Can-ary birds in large flocks. There are also lizards of the common, and another fort; fome infects, as locuits; and three or four sorts of dragon-flies.” Mr. Ander-son was informed that a shrub is common here, agreeing exactly with the defcription given by Tournefort and Linnaeus of the tea shrub, as growing in China and Japan. Another botan-ical curiosity, mentioned by him, is what they call the im-pregnated lemon. It is a perfect and diftinct lemon, in-closed within another, differing from the outer one only in being a little more globular. The leaves of the tree that produces this fort, are much longer than thoſe of the common one; and it was referred to him as being crooked, and not equal in beauty. Mr. Ander-son learnt alfo, that a certain fort of grape growing here is reckoned an excellent remedy in phthisical complaints; and the air and climate in general are remarkably healthful, and particularly adapted to give relief in fuch diseases. This he endeavoured to ac-count for by its being always poffible to procure a different temperature of the air, by retiding at different heights in the island; and he exprefsed his surprize that the English phyficians had never thought of fending their confumptive patients to Teneriffe, infted of Nice or Lisbon. They reckon that 40,000 pipes of wine are annually made, the greatest part of which is either confined in the {land, or made into brandy, and fent to the Spanish West Indies and North America.

In the Embaffy to China (vol. i.) the quantity of wine, conflifiting principally of white wine, faid to be exported from Teneriffe, is about 25,000 pipes annually made in the island. Part is fent to South America; and the Englifh take off a confiderable quantity in return for manufaftures; and the North Americans in payment of corn, flaves, horfes and tobacco, which laft article is contraband and smuggled.

Tobacco or snuff is in universal use; and that which is legally imported is fold at fo high a price, that the temptation to smuggling is irrefifible. The royal monopoly extends even to orchards or orchil, a fubftance used in dyeing. Formerly there was made at Teneriffe a great quantity of Canary fack, which the French call “vina de Malvasia,” and we, corruptly after them, name Malmy (from Malvasia, a town in the Morea, famous for fuch luscious wine). In the 17th century, and fihl later, much of this was imported into Eng-land, and little wine is now made there except that defcribed by Capt. Cook, and which he compares with Madeira, the latter being as much fuperior to the former, as frong beer is to small. But the great difference of price is a recommendation of it. Besides wine, which is the chief produce of the ifland, beef may be had at a moderate price. The oxen are small and bony, and the meat lean. Hogs, sheep, goats, and poultry, may alfo be bought at a moderate rate; and fruits, fuch as grapes, figs, pears, mulberries, plam-tains, and mulf melons, are in great plenty. Their pampems, onions, and potatoes, are alfo very good of their kind. The Indian corn, which is their produce, and alfo their fruits and roots, may be had at a very reafonable rate. They have no plentiful supply of fish from the adjoining sea; but a confiderable fhillery is carried on by their veffels upon the coaft of Barbary; and the produce of it sells at a rea-fonable price. Capt. Cook fays that he found Teneriffe to be a more eligible place than Madeira for fhips bound on long voyages to touch at. At Teneriffe they make a little flik; but unlefs we reckon the filtering-fones, brought in great numbers from Grand Canary, the wine is the only confider-able article of the foreign commerce of Teneriffe. None of the race of inhabitants found here when the Spaniards disovered the Canaries, now remain a diftinct people, having intermarried with the Spanifh fettlers; but their de-fcendants are known from their being remarkably tall, large-boned, and ftrong. The men are in general of a fawny colour, and the women have a pale complexion, entirely deftitute of that bloom which diftinguifhes our northern beauties. The Spanish custom of wearing black clothes continues amongst them; but the men feem more indifferent about this, and in some meafe drefs like the French.

According to Capt. Cook, the peak of Teneriffe is situated in N. lat. 26° 18', and upon this supposition its longitude will be

\[
\begin{align*}
\text{The time-keepers} & \quad 19^\circ \ 0' \\
\text{Lunar observations} & \quad 16 \ 30 \ 20 \\
\text{Mr. Varila} & \quad 16 \ 46 \ 0
\end{align*}
\]

But if its latitude be 26° 12' 54", as in Malkeyne's British Mariner's Guide, its longitude will be 13° 30' more easterly. The variation (August 1776) by a mean of all Capt. Cook's compaifles was found to be 14° 41' 20" W. The dip of the N. end of the needle was 61° 52' 30''.

TENERIFFE, a town of South America, in the govern-ment of the Caraccas, and province of St. Martha; 80 miles S.S.W. of St. Martha. N. lat. 10° 2'. W. long. 74° 30'.

TENSMUS, in Medicine, an infeffant and urgent de-fire to go to ftool, while the evacuations are exceedingly feanty, of a mucous or bloody appearance, and are attended with fiercely any relief of the diftreffing fenfation which preceded them. It may be brought on by any caufe which excites excifive irritation in the reftum, either direftly, or by sympathy with neighbouring organs, fuch as the bladder, uterus, proflate gland, or urethra. Thus it is frequently a symptom of a tume in the bladder, of inflammation of the neck of that organ, of fistula, of gonorrhoea virulenta, and afo of pregnancy. In its moft acute form, tenemus more commonly
commonly occurs as a consequence of disease affecting the intestines themselves, and more especially of dysentery: it is also frequently excited by ascariides, or hemorrhoidal tumours within the rectum. See Dysentery.

The treatment of this affection must of course be adapted to the nature of the irritation which has occasioned it; and the removal of the irritating cause will generally be followed by the cessation of the effect. When this, however, cannot be accomplished, the introduction of opium as a suppository into the rectum, or united with a flarly glyster, will often procure essential relief.

TENESSEE, in Geography. See Tennessee.

TENESUR, a town of Egypt, on the west branch of the Nile; 3 miles S. of Amrass.

TENET, a particular opinion, dogma, or doctrine, professedly held by some divine, philosopher, &c.

The distinguishing tenets of the several sects in religion, and philosophy, are the names of the sects themselves.

TENEX, or Tenes, in Geography. See Tennis.

TENEZA, a town of Morocco; 43 miles W.S.W. of Morocco.

TENA, in Botany, a name by which some authors have called the cocoa-nut tree, or palma indica nucifera of other writers.

TENGA, in Geography, a city of China, of the first rank, in Hou-ouiang; 550 miles S. of Nanking. N. lat. 31° 26'. E. long. 113° 17'.

TENGAPATAM, a town of Hindostan, on the sea-coast, in the country of Travancore; 20 miles S.W. of Travancore.

TENGI, a town of Persia, in the province of Schirvan; 25 miles N. of Scambache.

TENILO, a river of Lapland, which falls into the Tornen, which, as well as the lake and mountain of Niemi, has been celebrated by Maupertuis for picturesque beauty.

TENGIS, a lake of Independent Tartary, about 140 miles in length by half that breadth, being the largest lake in Asia after the seas of Aral and Baikal. It is also called Balkash or Puscaté. This lake, with two others that are very considerable, belong to the Kalmucks subject to China.

TENGMO, a small island on the E. side of the gulf of Bothnia. N. lat. 63° 10'. E. long. 21° 52'.

TENG-TCHOUEN, a city of China, of the second rank, in Yun-nan; 1182 miles S.W. of Peking. N. lat. 26° 2'. E. long. 99° 49'.

TENGZEGzet. See Tenzegzet.

TENIA. See Tenia.

TENIERS, DAVID, the younger, in Biography, was born at Antwerp in 1610, and was initiated in the art of painting by his father; but he afterwards became a disciple of Adrian Brouwer, and is also said to have had the happy's and honour of receiving instructions from Rubens. The subjects and the style he adopted were, as we have said, the same with those employed by his father; but with a more fertile imagination, he produced compositions infinitely more varied and ingenious, with colouring and effect more vivid and engaging, more rich and transparent; and with a facility of execution perfectly enchanting. It is true, with an elevated exhibition of character or expression; what there may be of those qualities, was more probably a fortunate hit, than any result of meditation or intention. In this respect Jan Stein, and our own Wilkie, have as much the superiority over Teniers, as he possessed by the power of his execution.

At the first display of his powers he was not so successful as he merited, but it was not long that he lay neglected: the archduke Leopold being made acquainted with his merits, immediately distinguished him by his patronage; appointed him his principal painter; honoured him by making him a gentleman of his bed-chamber; presented him with a chain of gold, to which his portrait was affixed; and gave him the superintendence of his gallery of pictures, which contained works of the most distinguished masters of the Italian and Flemish schools. Of this gallery, Teniers made several pictures, in which he imitated the manners of the various masters so successfully, as to obtain the name of the Proteus of painting. He also amused himself by making compositions in the styles of different painters of renown, as Titian, Tintoretto, the Baffans, Rubens, &c; and in their execution endeavoured to imitate the touch of those great men. These imitations are generally known under the name of pastiches, and have frequently been mistaken for originals, and fold as such.

There were the amusements and indulgencies of idle fancy; his fame red for more full and honourable support upon his original productions in his own proper style. He was a constant and faithful observer of nature; and in his favourite subjects, village festivals, fairs, and merry-makings, he has exhibited, with a most engaging freedom, the manners and characters of his countrymen. That he might conveniently mingle with the scenes he chose to represent, he established himself in the village of Perk, between Antwerp and Mechlin, and there, with a painter's eye, he observed the undisturbed impulse of the natural character of the lower classes among the people, and has left many beautiful and pleasing remembrances of occurrences interesting, nay sometimes disgusting in themselves, but rendered engaging by his delightful mode of representing them. One peculiar charm there is to be found in the best pictures of Teniers, more perfectly obtained than in the works of other artists, and that is, the complete effect of atmosphere, silver, pure, and natural; Claude de Lorrain himself does not surpass him; and this truth, though yielded on simple materials, in scenes flat and infipid in their forms, yet makes amends for their natural want of interest by its truth and simplicity.

In the interior of apartments, of the cottage, the cabinet, the parlor, or charcoal's laboratory, he is not less admirable by his clearness and precision than in his exteriors. He surpassed in his knowledge of perspective, and in his freedom, as much as he is excelled by the latter in truth and
of tone and completion of character. His pencil is exceedingly light and dexterous; and by continual practice upon the sametyulem, he had acquired a promptness almost unparalleled. This freedom of execution enabled him to paint an immense number of pictures: it was not unusual for him to finish a picture in a day; and he used jocously to observe, that to contain all the pictures he had painted, it would be necessary to have a gallery two leagues long. He not unfrequently afflicted the landscape painters of his day, by putting figures into their pictures; and many works of Artois, Van Uden, Brougel, and many others, owe an increased value to this circumstance. His works are numerous in the collections of this country, and still bear very high prices. Teniers lived to the advanced age of eighty-four, and died at Brussels in 1694.

He had a younger brother named Abraham, who also painted the same kind of subjects in the same style, and from this circumstance his works are sometimes mistaken for those of David, though they are much inferior in taste and execution.

TENINE, in Geography, a town of South America, in the province of Tucuman; 20 miles S.W. of St. Yago del Elerio.

TENIS, a lake of Ruffian Tartary, 60 miles in circumference. N. lat. 53° 20'. E. long. 74° 4'.

TENISON, Thomas, in Biography, archbishop of Canterbury, was the son of the Rev. John Tenison, recter of Mundeley, in Norfolk, and born in the year 1636. He received his university education at Benet college, Cambridge, of which he became a fellow in 1652. Having officiated for some time as a tutor in his college, he was presented in 1665 to the cure of St. Andrew the Great in Cambridge, and continued his attention to his parochial duty during the plague. In 1667 he became chaplain to the earl of Manchester, and obtained a rectory at Huntingdonshire. His first publication appeared in 1670, and was entitled "The Creed of Mr. Hobbes examined, in a feigned Conference between him and a Student in Divinity." In 1674 he was chozen principal minister to the church of St. Peter's Mancroft, Norwich; and in 1678 he published a "Difcourse of Idolatry," and in 1679 "Bacooniana," or some pieces of the great lord Verulam, with a general account of his writings. As he was one of the royal chaplains in 1680, he graduated D.D., and was presented by the king to the vicarage of St. Martin's-in-the-Fields, London. As an antagonist to popery, the apprehension of which was then very prevalent, he wrote several works against it, and also against Socinianism; and whilst he was guarding the church against those whom he conceived to be its enemies, he acquired still greater honour by liberal benefactions to the poor, and by laying the foundation of an endowed school and public library, which he afterwards completed. He blended gravity with moderation to such a degree, as to command general esteem; and accordingly he was elected by the unfortunate duke of Monmouth to prepare him for his execution. He also conducted himself with so much prudence at court, that he is said to have had a personal interest even with James II. In the reign of William he avowed himself a friend to the dissenters and toleration; and after his promotion to the archdeaconry of London, he was appointed one of the commissioners for reviewing the Litany, with a view to the comprehension of the Separatists. He thus recommended himself to queen Mary, and by her interceded he obtained the fee of Lincoln, in 1691. Within three years he was unexpectedly advanced to the archiepiscopal fee of Canterbury, more on account of his moderate and pacific principles, than for any procedinece to which he had attained among men of letters or theologians. He attended queen Mary on her death-bed; and incurred the severe animadversions of the deprived bishop Ken, for not having reminded her majesty of her culpable want of duty to her father, by confequently to wear a crown which rightfully belonged to him. His conduct during the reign of King William was uniformly confident with his principles, and both were so pleasing to his majesty, that he distinguished the prelate by many tokens of respect and confidence. In the reign of queen Anne, he was not, as we may naturally imagine, much regarded; more especially as he retained his just ideas of toleration, and refitted, though not without a share of obloquy, some of the high-church measures which were then countenanced. Nevertheless he displayd on various occasions his attachment to the establisht church, as well as his habitual bounty to the indigent. His last public act was the coronation of George I; and afterwards finking under the decay of advanced age, he closet his life at Lambeth, December 1715, in the seventy-ninth year of his age. As he left no issue, he bequeathed a considerable part of his property to charitable purposes. His character was uniformly respectable; and his conduct in difficult times was irreproachable and exemplary. Biog. Brit. Gen. Biog.

TENMENTALE, or TENMANTALE, in our Ancient Cylouns, originally signifies the number of ten men, which number, in the time of the English Saxons, was called a deanency; and ten deaneries made what we call an hundred.

These ten men were bound for each other to preserve the public peace; and if any of them was found guilty of a breach of it, the other nine were either to make satisfaction, or to bring the criminal before the king.

TENMENTALE was also used for a duty, or tribute, paid to the king, consisting of two shillings for each ploughland; probably thus called, because each person of the deanery was bound to see it paid.

TENNA, in Geography, a river which rises in the Appenines, and crossing the marquisate of Ancona, runs into the Adriatic, about 4 miles E.N.E. of Ferme.

TENNE, TENNY, or Tenny, in Heraldry, a bright colour, made of red and yellow mixed; sometimes also called tybby, and expressed in engraving by diagonal lines drawn from the dexter to the sinister side of the shield, traversed by perpendicular lines from the chief; and marked with the letter T.

In the coats of all below the degree of nobles, it is called tenny; but, in those of nobles, it is called byacinth; and, in princes' coats, the dragon's head.

TENNEAH, in Geography, a town of Bengal; 35 miles N. of Midnapur.

TENNEBERG, a mountain of Saxony, in the principality of Gotha; 4 miles S.W. of Gotha.

TENNELIERS, a mountain of France, in the department of the Aube; 4 miles E. of Troyes.

TENNESSEE, one of the United States of America, situated between 35° and 36° 30' N. lat., and 4° 20' and 13° 30' W. long. from Washington. It is bounded on the north by Kentucky and part of Virginia, on the south by Georgia and the Mississipi territory, on the east by North Carolina, and on the west by Missouri territory. Its extent from north to south is 412 miles, and from east to west 420 miles. Its area is 40,000 square miles, or 25,600,000 acres. The Indian claim has been extinguished in two portions of this country, the cahern and the western, comprehending one-third part of the flate. The former is bounded north by Virginia, from the south-east corner of Kentucky, to the north-west of North Carolina; easterly by North Carolina;
TENNESSEE.

Carolina; westerly by Cumberland mountain, Emery's river, &c. and southerly by a line marked from place to place, as a continuation of the Cherokee boundary. The western tract, thus purchased of the Indians, lies on Cumberland river; and is bounded north by Kentucky; easterly by a line running from the north-east to the south-west; and south and west by a line of several thousand angles, run according to the Tennessee Ridge, which separates the waters of the Cumberland from those of the Tennessee river. The general course of this ridge-line is first westerly, and then north-westerly; which, imagining the zigzag reduced into two straight lines, makes the figure of the tract a trapezium. The longest side is that adjoining Kentucky, the length of which, ascertained by measurement, is nearly 160 miles. The length of the easterly side is about 90 miles. The easterly is generally called the Holston settlement, and the western the Cumberland settlement, from those two prime rivers, which traverse the countries respectively. Between these settlements lies a spacious wilderness, which the Cherokees claim and traverse in hunting, and which, from one limit of their claim to the other, as the road goes, is about 70 miles wide.

This state, as it was erected and organized in 1796, is divided into three districts. The eastern settlement is divided into two districts, Washington the eastern district, and Hamilton the middle district. The western settlement is the third or Mono district. The number of counties, &c. may be seen in the following topographical table.

<table>
<thead>
<tr>
<th>Counties</th>
<th>No. Inhabitants</th>
<th>Chief Towns</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anderson</td>
<td>3959</td>
<td>Maryville.</td>
</tr>
<tr>
<td>Bledsoe</td>
<td>8839</td>
<td>Maryville.</td>
</tr>
<tr>
<td>Blount</td>
<td>3259</td>
<td>Elizabethtown.</td>
</tr>
<tr>
<td>Campbell</td>
<td>2668</td>
<td>Tazewell.</td>
</tr>
<tr>
<td>Carter</td>
<td>4190</td>
<td>Rutledge.</td>
</tr>
<tr>
<td>Claiborne</td>
<td>4798</td>
<td>Greenville.</td>
</tr>
<tr>
<td>Cocke</td>
<td>5514</td>
<td>Knoxville.</td>
</tr>
<tr>
<td>Granger</td>
<td>6307</td>
<td>Blountville.</td>
</tr>
<tr>
<td>Greene</td>
<td>9713</td>
<td>Jonesborough.</td>
</tr>
<tr>
<td>Hawkins</td>
<td>7043</td>
<td></td>
</tr>
<tr>
<td>Jefferson</td>
<td>7309</td>
<td></td>
</tr>
<tr>
<td>Knox</td>
<td>10171</td>
<td></td>
</tr>
<tr>
<td>Rhea</td>
<td>2504</td>
<td></td>
</tr>
<tr>
<td>Roane</td>
<td>5581</td>
<td></td>
</tr>
<tr>
<td>Sevier</td>
<td>4595</td>
<td></td>
</tr>
<tr>
<td>Sullivan</td>
<td>6847</td>
<td></td>
</tr>
<tr>
<td>Washington</td>
<td>7740</td>
<td></td>
</tr>
<tr>
<td></td>
<td>110367</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Counties</th>
<th>No. Inhabitants</th>
<th>Chief Towns</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bedford</td>
<td>8242</td>
<td>Shelbyville.</td>
</tr>
<tr>
<td>Davidson</td>
<td>15608</td>
<td>Nashville.</td>
</tr>
<tr>
<td>Dickson</td>
<td>4516</td>
<td>Winchester.</td>
</tr>
<tr>
<td>Franklin</td>
<td>5790</td>
<td>Pulaski.</td>
</tr>
<tr>
<td>Giles</td>
<td>4546</td>
<td></td>
</tr>
<tr>
<td>Hickman</td>
<td>2538</td>
<td></td>
</tr>
<tr>
<td>Humphreys</td>
<td>1511</td>
<td></td>
</tr>
<tr>
<td>Jackson</td>
<td>5401</td>
<td>Williamston.</td>
</tr>
<tr>
<td>Jackson</td>
<td>12359</td>
<td>Clarksville.</td>
</tr>
<tr>
<td>Maury</td>
<td>4028</td>
<td>Columbia.</td>
</tr>
<tr>
<td>Overton</td>
<td>5643</td>
<td>Monroe.</td>
</tr>
<tr>
<td></td>
<td>78284</td>
<td></td>
</tr>
</tbody>
</table>

Brought forward - 78284

Robertson - 7270
Rutherford - 10259
Sumner - 13592
Smith - 11549
Stuart - 4442
Wilson - 11592
Williamson - 13153
White - 4028
Warren - 5725

160360

The following counties have been laid out since the last census was taken:

Greenville,
Wayne.

The eastern part of this state is mountainous, the middle part hilly, and the western part mostly level. The climate among the mountains is said to be delightful; in the middle part, temperate and agreeable; in the western part, hot in summer, and mild in winter. The diseases to which the adult inhabitants have been most liable are pleurisy, rheumatism, and rarely agues and fevers; but, on the whole, the inhabitants are generally healthy, and this salubrity of the state has been partly attributed to its having few flagrant waters. The principal rivers of this state are the Cumberland, the Holston or Holston, the Tennessee, the Clinch, the Notachuckey or Nolichucky, the French Broad, the Hiwassee, the Duck, the Redfoot, the Obion or Oby, the Forked Deer, and the Wolf. The chief of these rivers are described under their proper names. The mountains in this state are numerous; some of them, particularly the Cumberland (which see), or Great Laurel Ridge, are the most stupendous piles in the United States. Stone, Yellow, Iron, Bald, SMOKEY, and Unaka mountains adjoin each other, and form, in a direction nearly north-east and south-west, the easterly boundary of the state. In these mountains are innumerable caverns and caverns. North-west from these, and separated from each other by vales from 5 to 15 miles wide, rise Bay's mountain, Copper Ridge, Clinch mountain, Powell's mountain, and Wel-ling's Ridge. The four last terminate north of the Tennessee river, and these, as well as the others, are branches of Virginia mountains. They are all encircled by vales, which open channels for rivers and roads for passage. Although the soil on the mountains is poor, that of the vales is fertile; improving in the middle of the state, and in the western part becoming rich. It produces cotton, which is the staple commodity, and the principal article of export, tobacco, indigo, Indian corn, hemp, flax, rice, wheat, rye, oats, barley, and all kinds of vegetables in high perfection. The trees and plants found in this state are poplar, hickory, black and white walnut, all kinds of oaks, buck-eye, beech, fycamore, black and honey locust, ash, hornbeam, elm, mulberry, cherry, dogwood, saffrañas, papaw, cucumber-tree, coffee-tree, and the sugar-tree. In the eastern district is a species of pitch-pine, useful for boards, timber, and tar. The under-growth, in many places, and especially in low grounds, is cane, some of which is upwards of 20 feet high, and so thick as to prevent any other plant growing; there are also Virginia and Seneca sassafras-root, gingeng, Carolina pink, angelica, fenn, lobelia, Indian physic, spice-wood, wild plum, crab-apple, haws, hazle-nuts, sweet anise, red bud ginger, spikenard, wild hops and grape vines. The glades are covered with wild rye, wild oats, clover, buffalo-grass,
TENNESSEE.

geese, strawberries, and pea vines. On the hills, at the heads of rivers, and in some high cliffs of Cumberland, are found majestic red cedars; many of these trees are four feet in diameter, and forty feet clear of limbs. The commerce of this state is much facilitated by the rivers Tennessee and Cumberland, and their respective branches. Both these rivers empty into the Ohio, shortly after they pass the north boundary of the state. As the waters of the Cumberland from Nashville, and of the Tennessee from the Muscle Shoals to the Ohio, are navigable to the Ohio and Mississippi, the people of course, who live in this or the adjacent country, have the same advantages of water conveyance for trade, as those who live on the Ohio or Mississippi, to New Orleans or elsewhere. Besides, there is another probable avenue through which trade will be carried on with this and the adjacent country, which is from Mobile, up the waters of the Mobile river as far as it is navigable; thence by a land carriage, of about 50 miles at most, to Oochappoo creek, which empties into the Tennessee at the lower end of the Muscle flats. The mouth of this creek is the centre of a piece of ground, the diameter of which is five miles, ceded by the southern Indians at the treaty of Hopewell, on Kecowee, to the United States, for the establishment of trading posts. The iron works of Tennessee are large and numerous. The minerals of this country are iron-ore, limestone, coal, coppears, alum, nitre, lead, and some silver. Mineral springs, strongly impregnated with sulphur, are found in various parts of the country. On the waters of French Broad river is a fine, large, clear, medicinal, warm spring, the beneficial effects of which have been experienced by many persons who have resorted to it from the Carolinas, Georgia, and northern parts of Virginia. Salt is manufactured in considerable quantity, particularly on the north fork of Holston. Some herds of the bison are still found on the branches of the Cumberland river, though multitudes of them have been wantonly destroyed. The stag is occasionally found among the mountains; deer are scarce; bears, panthers, wild cats, and wolves, still remain. Beavers, mink-rats, and otters, are plentiful in the upper branches of Cumberland and Kentucky rivers. Racoons, foxes, opossums, and squirrels abound; as also pheasants, partridges, pigeons, swans, wild turkeys, ducks, and geese; as well as bald eagles, parroquets, hawks, cranes, and buzzards. The rivers are well stocked with all kinds of fresh-water fish.

The chief towns of Tennessee are Knoxville, Nashville, and Jonesborough; which see respectively.

The prevailing denomination of Christians in this state is composed of Presbyterians, intermixed with Baptists, Methodists, and Friends. With a view to mental and moral improvement, several schools and colleges are established in this state. Three colleges are established, one in Knox, one in Washington, and one in Greene county.

By the constitution of this state, which was formed and ratified at Knoxville, February 6, 1796, the legislative authority is vested in a general assembly, consisting of a senate and house of representatives. The number of representatives is to be fixed once in seven years, by the legislature, according to the number of taxable inhabitants, who are to be numbered septennially; the number of representatives not to exceed twenty-six, until the taxable inhabitants shall be 40,000. The senators are never to be less than one third, nor more than one half the number of the representatives, and are to be chosen upon principles similar to those for the choice of representatives. The election for members of both houses is biennial. The executive power of the state is vested in a governor, chosen by the electors of the members of the legislature: he is appointed biennially, and is commander-in-chief of the army and navy, except in the service of the United States. Every freeman of 21 years of age, possessing a freehold in the county, and having been an inhabitant of the state for five months preceding, may vote for the members of the legislature. The house of representatives has the sole power of impeaching, and the senate of trying impeachments. The judicial power is vested in courts of law and equity. County officers are sheriffs, coroners, truants, and constables. Military officers are to be elected by persons subject to military duty. Ministers of the gospel are not eligible to a seat in the legislature. No person who denies the existence of God, or a future state, can hold any civil office. The oath of allegiance and of office is to be taken by persons holding any office of trust or profit.

In the character of the inhabitants there is nothing peculiarly discriminating; but, in general, a great simplicity of manners prevails. Among the curiosities of the country we may reckon its numerous caves; and on the Enchanted mountain there are on several rocks impreffions resembling the tracks of turkeys, bears, horses, and human beings, the latter having uniformly fix toes each. Besides these, there are many other fanciful figures. The Indian tribes within and in the vicinity of this state are the Cherokee and Chickasaws; which see respectively.

The country now called Tennessee was included in the second charter granted by king Charles II. to the proprietors of Carolina; and in a subseuent division, it constituted a part of North Carolina. In 1754, at the commenceinent of the French war, not more than fifty families had settled here, who were either destroyed, or driven away by the Indians before the close of the following year. It remained uninhabited till 1765, when the settlement of it commenced; and in 1773, (thenc was the rapid accession of emigrants,) the country as far westward as the long island of Holton, an extent of more than 120 miles in length from caft to west, was well peopled. In 1789, after preparatory measures, the territory was ceded by the North Carolina legislature, on certain conditions, to the United States. In 1790, February 25, Congress passed an act, accepting this cession; and, by another act, passed May 26, 1790, provided for its government under the title of "The Territory of the United States of America south of the river Ohio." On the 8th of June following, the president of the United States, by and with the advice and consent of the senate, appointed the Hon. William Blount, esq., a citizen of North Carolina, governor in and over the said territory; in which office he continued during the territorial government, and was president of the convention that formed the constitution under the title of "The Constitution of the State of Tennessee," of which we have given an abstrac.

The peace of the citizens of this territory has been disturbed many years past, by Indian wars, or incursions from the savages for the purpoises of murder and plunder; they are now at peace. In the year 1796, this territory was in due form erected into an independent state, making the sixteenth in the Union. Morie Melish.

TENNESSEE RIDGE, the most considerable range of mountains in the state of Tennessee, separating the streams which run to the Cumberland and Tennessee rivers. In some parts it rises into abrupt hills, but in others admits of good roads. See CUMBERLAND MOUNTAIN.

TENNESSEE, called by the French Cherokee, and absurdly by others the Hoghohege river, is the largest branch of the Ohio; it is 600 yards wide at its mouth. It rises in the mountains of Virginia, N. lat. 37°; and pursues a course of about 1000 miles fourth andouth-west, nearly to
TEN

N. lat. 34°, receiving from both sides a number of large tributary streams. It then wheels about to the north, in a circuitous course, and minglest with the Ohio, nearly 60 miles from its mouth. From its entrance into the Ohio to the Muscle shoals, 250 miles, the current is very gentle, and the river deep enough, at all seasons, for the largest row boats. The Muscle shoals are about 20 miles in length. The bed of the river in this distance consists of broken stones, easily removed; and the navigation will admit of much improvement. At these shoals the river spreads to the width of three miles, and forms a number of islands, and is of difficult passage, except when there is a fall in the river. From this place to the "Whirl," or "Suck," where the river breaks through the Great Ridge, or Cumberland mountain, is 250 miles, the navigation all the way excellent. The Whirl, as it is called, is in about N. lat. 35°. It is reckoned a greater curiosity than the burfting of the Patowmack through the Blue Ridge. The river, which a few miles above is half a mile wide, is here compressed to the width of about 70 yards. Just as it enters the mountain, a large rock projects from the northern shore, in an oblique direction, which renders the bed of the river still narrower, and causes a sudden bend: the water of the river is of course thrown with great rapidity against the southern shore, whence it rebounds around the point of the rock, and produces the whirl, which is about 80 yards in circumference. Boats pass the whirl without danger or difficulty. Such is the situation of the shore, that boats ascending the river may be towed up. In less than a mile below the whirl, the river f...
The Ten

S.W. part of the island. See Tino.—Also, a town of Greece, in Thessaly.

TENOS. See TENOR.

TENSA, in Geography, a river of Louisiana, which forms with the Walhita and bayou Long, an island of an oval shape, about 50 miles in circumference. Immediately above this island, there is another, called Sicily island, about 30 miles in circumference. At the lower end of Sicily island, the bayou Tena spreads into a lake of 15 or 20 miles in length, and nearly parallel with the Mississippi. The Tenia lake receives two considerable streams, the river Aux Beufs, and the bayou Maçon.

TENTE, TIME, in Grammar, an inflexion of verbs, by which they are made to signify, or dilating, the circumstance of time of the thing they affirm or attribute.

The affirmations made by verbs are different as to point of time; since we may affirm a thing is, or was, or will be: hence a need of a set of inflexions, to denote those several times; which inflexions our English grammarians call by a barbarous word, tenses: from the French temps: most other languages call them simply times.

There are but three simple tenses: the present, as, I love, amo; the preterit, preteritis, or pass, as, I have loved, amavit; and the future, as, I will love, amabo.

But, in regard that in the preterit tense one may either express the thing as yet done or past, or indefinitely and barely that it was done: hence, in most languages, are twain kinds of preterite; the one definite, marking the thing to be perfectly done; as, I have written, I have said: and the other indefinite, or nigraph, denoting a thing done indeterminately; as, I wrote, I went.

The future tense admits also of the same variety.

Besides the three simple tenses, others have been invented, called compound tenses: expressing the relation of the simple ones to each other. The first expresses the relation of the past to the present, and is called the preterit imperfect tense, because it does not mark the thing simply and properly, as done, but as imperfect, and perfect with respect to another thing past; as, I was after dinner when he entered; even interro. canamab.

The second compound tense marks the time past doubly, and is therefore called the plusquamperfect tense; as, I had supped; convorabam.

The third compound tense denotes the future with respect to the past; as, I shall have supped; canamam.

The several tenses, or times, it is to be observed, are properly denoted in the Greek and Latin by particular inflexions; in the English, French, and other modern tongues, the auxiliary verbs to be, and to have, etre and avoir, are called in. As to the Oriental languages, they have only two simple tenses, the past and present, without any distinctions of imperfect, more than perfect, &c.; but this renders those languages subject to abundance of ambiguities, from which others are free.

The ingenious Mr. Harris, in his Hermes, p. 119, &c., proposes the following theory of tenses. The tenses, he says, are used to mark present, past, and future time; either indefinitely, without reference to any beginning, middle, or end; or else distinctly, in reference to such distinctions. If indefinitely, then we have three tenses, an aorist of the present, an aorist of the past, and an aorist of the future. If distinctly, then we have three tenses to mark the beginnings of the three times; three to denote their middle; and three to denote their ends; in all, nine. The three first of these tenses he calls the indefinite present, the indefinite past, and the indefinite future. The next three, the middle present, the middle past, and the middle future. And the three last, the complete present, the complete past, and the complete future. Thus the tenses in their natural number appear to be twelve; three to denote time absolute, and nine to denote it under its respective distinctions. The following examples will illustrate the application and use of each tense. The perfect of the present, γηρος, ferbo, I write; the perfect of the past, γερως, serifs, I wrote; the perfect of the future, γερος, ferfam, I shall write.

Inceptive present, μανός γερος, scripturus sum, I am going to write; middle or extended present, μαννος γερος, feribs, or feribens sum, I am writing; implicative present, γερος, scriptibs, I have written. Implicative past, μαννος γερος, scripturam, I was beginning to write; middle or extended past, μαννος γερος, feribam, I had done writing. Implicative future, μαννος γερος, scripturam ero, I shall be beginning to write; middle or extended future, μανονς γερος, feribens ero, I shall be writing; implicative future, scripturam, I shall have done writing. The author has particularly shewn what traces are discoverable in favour of this system, either in languages themselves, or in those authors who have written upon this part of grammar, or in the nature and reason of things.

TENSIFF, in Geography. See TANSIIFF.

TENSION, TENSO, the state of a thing bent, or the effort made to bend it.

Animals only sustain and move themselves by the tension of their muscles and nerves. A chord or string gives an acuter or deeper sound, as it is in a greater or less degree of tension.

Tension, Tenso, lasc, in the Ancient Music, was used to signify any pitch of sound, produced by induction or remission. Vide Aristoxen. p. 10. 13. edit. Melborn. Aristoxenus observes, there are five things to be considered about sound, viz. lasc, tenso; intension; extention; omission; &c.; acumen; and gravitas.

TENSIFFES, in Geography, a mountain of Africa, in the empire of Morocco, on the borders of Sugulme; 60 miles E. of Morocco.

TENSOR, in Anatomy, a name given to different muscles.

Tensor Palati, a muscle of the soft palate. See DeLUGITION.

Tensor Tymanis, a muscle of the internal ear. See EAR.

Tensor Vaginae moritis; muscleus faeice lata; is an elongated and flattened muscle, narrow above, and becoming considerably broader below, situated at the upper and outer part of the thigh, and extending from the anterior superior spine of the ilium, to a short distance below the great trochanter. It is covered by a thin layer of the faecia; and it lies upon the rectus cruris, the vastus externus, and a small part of the gluteus medius and minimus, separated from them by a thin production of faecia, and by copious cellular tissue. Its front edge is parallel, above, with the outer margin of the patellus; below, they are parted by an interval, occupied by the rectus anterior. The posterior edge is connected to the gluteus medius; being separated from it below by cellular tissue. The upper extremity is attached to the anterior superior spine of the os innominatum, between the patellus and the gluteus medius. The muscle, which is here narrow, passes obliquely downwards and outwards, growing considerably broader and thinner, and terminates below the great trochanter, at the angle of separation of the two layers of the faecia, between which it is situated: this angle is its point.
point of infection. Its upper attachment is by means of a tendon, from which the fibres run to the fascia.

It will bend the thigh on the pelvis; or carry it outwards; or rotate it inwards. When the thigh is fixed, it will incline the pelvis on that limb.

**TENSTADT,** in Geography, a town of Saxon, in Thuringia; 11 miles N.W. of Erfurt.

**TENT,** Tabernacle, a pavilion, or portable lodge, under which to shelter, in the open field, from the injuries of the weather. See Tabernacle.

The word is formed from the Latin, tentorium, of tendo, to stretch; in regard tents are usually made of canvas, stretched out, and fastened by poles, with cords and pegs.

Arms encamp under tents: these are made of canvas, and are of various sizes. A captain's tent and marquee is generally 10 feet broad, 14 feet deep, and 9 feet high; those of the subalterns are a foot less; the major's and lieutenant-colonel's a foot larger; and the colonel's two feet larger. The subaltern's tent is two in a tent, and those of the horse one. The tents of private men are 6 feet square, and 5 feet high, and accommodate five soldiers. The tents for the horse are 7 feet broad, and 9 feet deep; they hold five men, and their horse-accoutrements.

**TENTS, Bell,** are so called from their resemblance to a bell, and serve to shelter the fires-arms from rain.

To pitch the tents, is to fix them up ready for habituation, by the assistance of a ridge-pole, two standards, and a number of ten-pins.

Most of the Tartars and Arabs are wandering people, that always lodge under tents.

The Hebrews lodged forty years under tents in the desert; which gave occasion to the Scenopegia, or feast of tabernacles.

**Text, Dark.** See Dark.

**Tent, in Surgery,** signifies a roll of lint or linen, for preventing the healing of openings, from which matter, or some other fluid, makes its escape. Tents are also employed for dilating openings. There are some tents which are made of sponge that has been compacted into as small a compass as possible, while filled with fluid wax, and then allowed to become cold. These are called sponge-tents, and, on becoming warm, after being introduced into parts, they have the property of swelling in a remarkable degree. We shall only say further upon this subject, that, upon the whole, tents are not so much employed in modern as in ancient practice; and there is no doubt that, unless their use be guided by moderation and judgment, they may do considerable mischief.

**TENTAMOODY,** in Geography, a town of Hindoostan, in the cerc of Rajamundry; 35 miles S.E. of Rajamundry.

**TENTATIVE** is sometimes used adjectively: thus we say, a tentative method, meaning a kind of artful or indirect method, which only proceeds by trying.

Tentative is also used substantively, for an essay or effort, by which we try our strength, or found an affair, &c. to see whether or no it will succeed.

In the French universities, tentative is the first thesis, or act, which a student in the theology-school holds, to show his capacity: if he answers well in this, the degree of bachelor is conferred on him.

**TEN-CHEOU-FOU,** or Ten-choo-foo, in Geography, a city of China, of the first class, in the province of Chang-tong, having under its jurisdiction one city of the second class, and seven of the third. It is situated on a rising ground, and fortified by a strong wall round it, and defended by a numerous garrison. The fortifications of this city include a large space not occupied by buildings; and when it was laid out, must either have been expected that it would increase in houses to a greater number than that of those who now occupy it, or the vacant space was allotted for military or other exercises. The bay, or rather road, of Ten-choo-foo, is not only open to the east and west, but partially sheltered towards the north by groups of small islands, scattered about at different distances, from five miles to twice as many leagues, off the main shore. The Mi-ia-tau islands are too distant to break off much of either wind or swell from that quarter. The anchoring ground consists in great part of hard sharp rocks; and at about 14 miles from the shore is a dangerous reef, covered at high water, extending nearly a mile east and west, round which the water shoals so suddenly as to render any approach to it very perilous. At Ten-choo-foo is constructed a kind of dock, or bauan, for vessels to load or discharge their cargoes. The entrance into it is between two piers, and is from 30 to 40 feet wide. The ground near the coast of the Yellow Sea is richly cultivated, and rides in a gentle ascent, which is terminated by high, broken, and barren mountains, apparently granitical. The passage between Ten-choo-foo and the Mi-ia-tau islands is called in the chart the Strait of Mi-ia-tau, in which it rifele the rife and fall of the tide are about seven feet. Staunton's Embassy, &c. vol. i.

**TENTER,** Tricular, or Proctor, a machine used in the cloth manufactury, to stretch out the pieces of cloth, stuff, &c. or only to make them even, and set them square.

It is usually about four feet and a half high, and, for length, exceeds that of the longest piece of cloth. It consists of several long, square pieces of wood, placed like those which form the barriers of a manège; so, however, as that the lower cross-pieces of wood may be raised or lowered, as is found requisite, to be fixed at any height, by means of pins. Along the cross-pieces, both the upper and under one, are hooked nails, called tenter-hooks, driven in from space to space.

To put a Piece of Cloth on the Tenter.—While the piece is yet quite wet, one end is fainted to one of the ends of the tenter; then it is pulled by force of arms towards the other end, to bring it to the length required; that other end being fainted, the upper lift is hooked on to the upper cross-piece, and the lowest lift to the lowest cross-piece, which is afterwards lowered by force, till the piece have its desired breadth. Being thus well stretched, both as to length and breadth, they brush it with a fluff hair-brush, and thus let it dry. Then they take it off; and, till they wet it again, it will retain the length and breadth the tenter gave it.

**TENTERDEN,** in Geography, is a small market-town in the hundred of the same name, in the lathe of Scray, and county of Kent, England, situated 18 miles S.S.E. from Maidstone, and 56 miles S.E. by S. from London. N. lat. 51° 4' 8". E. long. 0° 41' 8". At a remote period it was incorporated by the name of the "barons of the town and hundred of Tenterden;" which style was changed to that of the "baronet and commonalty," by letters patent of Henry VI., who at the same time annexed it as a member to the town and part of Rye, in Sussex, to which it is yet subject. Queen Elizabeth, in her forty-second year, granted the inhabitants a new charter, by which, in the place of a baronet, &c. the future government of the town was vested in a mayor, twelve jurats, twelve common-council men, a chamberlain, and a town-clerk. The present town-hall, which is occasionally used as an assembly-room, was built about the year 1792; the old one having been burned by an accidental fire. The market-house is a small, mean edifice of timber, now little frequented; the market itself being almost diffused, though still nominally
TEN

annually for the sale of cattle, wool, shop-goods, &c. According to the returns under the population act of the year 1811, the number of inhabitants in this town was 2786, that of houses 459. Many of the latter are respectable buildings, occupied by persons whose families have derived affluence from the grazing business carried on in the neighbouring parishes. The parish church is a spacious structure, and consists of a nave, north aisle, and chancel, with a well-built and lofty tower at the west end, on which is sculptured the arms of St. Augustine's monastery, to which foundation this church was appropriated in 1259. Besides the church, there are two places of religious worship for dissenters of different denominations. Dr. Harris mentions an ancient free-school, founded here by one of the family of Heyman of Somerset, and records some donations made for its support. The trustees are the mayor and jurats, who, according to Ha'fted, are so inattentive to the charity, that not any children are now educated on this foundation.

The chapel of Small Hithe, in Tenterden parish, was formerly, according to traditional report, a very considerable place, but is now reduced to a few farm-houses and cottages. The chapel was licensed by archbishop Warham, in 1509, "on account of the badness of the roads, and the dangers which the inhabitants underwent in their way to the parish church, from the waters being out."—Beauties of England and Wales, vol. viii. Kent, by E. W. Brayley.

TENTH, in English History. See Land-Tax.

Tents are said to have been first granted under Henry II., who took advantage of the fashionable zeal for crofuses to introduce this new taxation, in order to defray the expense of a pious expedition to Palestine, which he really or feemingly had projected against Saladin, emperor of the Saracens; whence it was originally denominated the Saladin tent. But afterwards fifteenth were more usually granted than tents.

TENTHS, Decima. See First-Fruits, and Tithe.

TENTHS, Office of, is kept in the Temple, under the direction of a receiver and his clerks.

Tenth, in Meafures, the octave above the third, and an octave below the seventeenth, or flop in the organ called the tierce. The tenth is a very pleasing conformance, but inferior in subtility to the third; for which reason the duets at the opera, since the principal sifth man's part has been performed by a tenor, have never given the audience that exquisite pleasure which they used to do, when sung by two sopranos.

TENTHREDO, in Entomology, a genus of the Hemiptera order of insects, the character of which are, that the mouth has a horny, arcuated mandible, within dentated; a straight jaw, obtuse at the apex; a cylindrical, trifid lip, with four unequal siliiform feelers; the wings flat, and tumid or feightly inflated; the piercers consisting of two ferated, fearedly prominent laminae; and the leucotem with two diftant granules.

The larvae of this genus reframe thefe of the order Lepidoptera, or real caterpillars; but are diftinguifhed from them by their more numerous feet, which are never fewer than fifteen, exclusive of the three ifth or thoracic pairs. When disturbed or handled, they usually roll themselves into a flat spiral. They feed, like the caterpillars of the lepidoptera, on the leaves of plants; and undergo their chrysalis flate in a frong gummy cafe or envelopment, prepared in autumn, out of which, in the enfuing spring, emerges the complete insect. The tenthredines form a numerous genius, and are divided into tribes or fections, according to the form of the antennae. Gmelin reckons 143 species.

N. B. The European species are marked with a star *, and the English with a crofs †.

Species.

A. Antenna elongated.

* FEROMATA. Antenna yellow; black body; hinder thighs larger; the larva green, with a bluish line on the back, and yellow at the fides.

* MARGINATA. Antenna yellowish at the apex; black body; the hinder segments of the abdomen white at the margin.

LUTEA. Antenna yellow; segments of the abdomen mostly yellow. This insect proceeds from a large green larva, of a finely granulated surface, with a double row of black specks on each side, and a dusky dorsal line bounded on each by yellow. It feeds on various species of willow, alder, and beech. The parchment-like cafe in which it envelops itself in autumn is of a pale yellowish-brown colour; and the chrysalis, which is of a pale dusky or brownish cafe, exhibits the limbs of the future fly, in fize equal to a common wasp, and of a yellow colour, bound with black; the antennae rather short, and strongly elevated.

AMERICENS. Body circular; abdomen beneath red; white lip. This inf neat is somewhat smaller than the preceding; its caterpillar, like that of the former, is of a green colour, and of a finely roughened surface, powdered with numerous whitifh specks. Feeds on the willow.

TRISTIS. Black, with yellow antennae, and wings brown at the apex; green larva, with an azure line on the back, black and yellow fringed.

VITELLINE. Abdomen above black; sides red; hinder thighs dentated; larva greenish.

LUCIDUS. Antenna black; body villous black. Found on the beech and alder.

* FASCIATA. Black; antenna black; primary wings with a brown band.

* SERICEA. Antenna yellow; thorax black; abdomen brassy; larva green, with two yellow lines.

OSCURA. Body smooth and black. Found in the groves of Sweden.

CONNATA. Black; abdomen with yellow bands. Found on the alder.

* NITENS. Antenna yellow; abdomen green-blue, shining. Suggested to be a variety of the sericea.

B. Antenna excallate, the outer ones thicker.

CLAVICORNIS. Black; abdomen yellow; apex black. Found in North America.

ANNULATA. Black; abdomen yellow; hinder terfi black, annulated with white.

* EXODIS. Antenna smooth; body black-blue, larva green, spotted with black, a rough lateral line yellow, sharp tail.

CILIARIS. Antenna beneath ciliated; hinder legs white. Found in Germany.

* USTULATA. Body black; abdomen blue, legs pale. On the canine robe. Larva green, with two white lines; head teftaceous; obscure band.

* CYANOCHRISA. Head and thorax bright-blue; abdomen faffron-coloured.

* TURATA. Black; back, zone, and three arcs, yellow-greenish.

BICOLOR. Black-blue; abdomen and base of the wings yellow; wings with a black band. Found in Austria.

* MELANOCHRA. Black; abdomen yellow; a small black line
line on both sides of the anus; legs and foles yellow; wings with a black spot.

*Tircholor. Head and thorax black; wings and feet brown; abdomen yellow.

*Ochropus. Head, thorax, middle of the breast, and apex of the hinder legs; black; abdomen and feet yellow.

C. Antenna setulatul.

Cephalotes. Black; abdomen with four yellow zones or belts. Found in Germany.

† Dorusata. Whitish; head and back of the thorax and abdomen black.

D. Antenna pubescent.

*Pini. Antenna lanceolate, and thorax pubescent. Larva blueish, and yellow at the tail end.

Juniperus. Antenna obtuse; thorax smooth; larva green, pointed with black.

E. Antenna filiform, with from seven to nine joints.

Americana. Thorax yellow; abdomen blue; wings black. Found in Surinam.

Costalis. Black, with the rib of the wings ferruginous. Found in Germany.

Lateralis. Black; middle of the back red; fides white. Found on the flowers of Sweden.

† Arcuata. Abdomen black; five arcs, with a band at the base and fides, yellow-greenish.

Rustica. Black; abdomen with three yellow belts, the hinder two interrupted; larva cinereous, with triangular brown spots on the back.

*Scolpilare. Antenna yellow; abdomen with five yellow belts, the first more distant.

Arietis. Body black, with four ferruginous segments of the abdomen.

Germanica. Body black; thorax before and abdomen red. Found in the groves of Germany.

Padi. Black, with thighs and legs white.

Cynipiformis. Green-brassy; yellow feet; hinder thighs brassy.

Cerasi. Body black; scutellum and feet yellow; larva gelatinous, black.


Flavicollis. Yellow; head and tail black. Found in Germany and Italy.

Luteicornis. Black; with antennae, mouth, base of the abdomen, and legs, yellow.

Mesorhelas. Abdomen yellowish; back black; arcs yellowish.

Punctum Album. Body black; abdomen at the sides white; hinder thighs red. Found in Germany.

† Blanda. Black; abdomen in the middle red; hinder thighs with a white spot.

Quadrimaculata. Black; hinder feet red; two spots at the base white.

* Rupipes. Body black; abdomen with two yellow belts; feet red.

* Campestris. Body black; abdomen with an unequal yellow belt; antennae and legs yellow.

* Atra. Body black; feet red.

* Viridis. Body green; abdomen above brown.

* Ovata. Body black; thorax above red; larva greenish, sprinkled with a kind of white powder.

Alni. Body black; head and thorax red.

* Ceraleucus. Violet; abdomen yellow; wings with a brown spot.

Vol. XXXV.
fore-feet sulphurose; the hinder soles with three intermediate white joints.

* FLAVEOLA. Antenne subclavated, black; base, mouth, sides, and five first segments of the abdomen and feet, yellow.

* ANNULATA. Yellow; antennae subclavated, black; apex of the thighs and soles annulated with black.

* EUGRIGNOSA. Black; antennae subclavated, and base with feet yellow; third, fourth, and fifth segments of the abdomen ferrugineous.

* SUBULATA. Black; antennae subulate at the apex; second to the fifth segments of the abdomen, as far as the hinder margin, legs and soles, yellow, and these annulated with black.

* MACRONATA. Black, with the seven-knotted antennae and abdomen yellow; the last segments from the second to the fourth black; the apex of the wings brown.

* VARI. Black; mouth, feutellum, and feutellar spots, white; the hinder segments of the abdomen and feet ferrugineous.

* SANGUINOLENTA. Black; with the hinder feet ferrugineous.

* DELABRATA. Black; the three last joints of the antennae and jaws white; legs and soles yellow.

* CANESCENTS. Grey-downy, brown, with grey wings.

* BIFASCIA. Brown, with black thorax; mouth, feutellum, and four spots at the feutelum, white; abdomen with two interrupted yellow bands; margin of the wings and feet yellow.

* BRACCATA. Black, with red thighs; the base of the four hinder legs, and the three penultimate joints of the antennae, white.

* RUFIPES. Black; the base of the abdomen, with a spot on both sides, and jaws, white; four fore-legs red.

* MELANOLEUCA. Black; mouth, thorax with a small line on both sides before the wings; a spot on the hinder thighs; legs, the sides of the abdomen from five to seven segments, and apex, white.

* MELANOCHORA. Black; mouth, four fore-feet, and base-flexure of the hinder thighs, yellow.

* LEUCOPUS. Black; the base-flexures of the thighs white; four anterior legs without, and middle of the hinder, white.

* VARICORNIS. Black, with red feet; fourth and fifth joints of the antennae and hinder legs at their base, white.

* OBSCURA. Brown; with the rib of the wings as far as the spot and feet ferrugineous.

* LIMBATA. Black; the hinder margins of the segments of the abdomen white; feet reddish.

* EXALBIDA. Black; with feelers and four legs obliquely white.

* FERRUGINOSA. Black; the antennae ferruginous forwards; the base and anterior margin of the wings, the first and fifth segment of the abdomen, the legs and soles, white.

* ANGUSTA. Black; body narrow and grey-downy.

* LUTEUS. Black; with the abdomen beneath and feet yellow-reddish.

* ALBIPES. Black; with legs and soles white.

* FLAVIVENTRIS. Black; mouth white; abdomen yellow; back and apex black; feet ferrugineous.

* PICA. Pitchy; anterior legs before, spot of the hinder thighs, and base, white; hinder feet red; the knees and soles black.

* FUSCIPES. Black; feet red; posterior soles brown.

* BIMACULATA. Pale; eyes, abdomen above the base, breast and two spots, black.

* LATA. Broad, black; the posterior segments of the abdomen white, from the second to the fifth interrupted.

* ANNULARIS. Pale, the antennae spotted with black at the base; vertex of a branchy figure, eyes, and the conjugate points at the back of the thorax and abdomen, black.

* SCRIPTA. Pitchy; mouth, and on the middle of the fore-part of the thorax the mark resembles V; the spot on both sides the feutellum white; two feutellar points white; feet, and under margin of the segments of the belly, yellow.

* LITERATA. Black; segments of the abdomen from the second to the fifth in the back, ovated spot on both sides and marging white; anterior feet, and four hinder legs on the fore-part, white.

* MELANORHDEA. Black, with yellow abdomen; the transverse spots of the back and anus black.

* GEMINATA. Black, with geminated antennae, and joints and legs pale.

* OCHROUSTES. Pitchy; with the abdomen beneath and feet yellow.

* RUFICAPILLA. Head and thorax red; the posterior margin of the latter and eyes black; the abdomen and feet yellow.

* DUBIA. Black; thorax before red; joints whitish.

* PALLECENS. Black; mouth and feet pale.

** F. Antenne setaceous; many Joints.**

** ERYTHROCEPHALA.** Body eærucele; head red.

** SYLVATICA.** Body black; feet and marks of the thorax yellow.

** NEMORALIS.** Body black; segments of the abdomen white at the side.

** CYNOSBATI.** Body black; feet ferrugineous, hinder annulated with white and black.

** SIGNATA.** Pale; thorax and three dorsal longitudinal spots black. Found in Germany.

** POPULI.** Black-blueish; mouth, feelers, and legs yellow.

** VAFFA.** Head black, variegated with white; feet tesselate. Found in Sweden.

** RETICULATA.** Wings varied with pale and brown, with elevated veins, white and reticulated. Found in Finland.

** BETULE.** Body red; thorax, anus, and eyes black; wings behind brown.

** FLAVA.** Yellow, with the spot on the wings ferrugineous.

** HEMORHIOHIDALIS.** Black; with the anus and feet tesselate. In Germany.

† NERON. Middle of the abdomen red; feutellum and point on the wings white.

** DEPRESSA.** Head and thorax black; marks yellow; abdomen and feet ferrugineous. In Austria and France.

** LINEARIS.** Black; legs, and five bands of the filiform abdomen, yellow. In Austria.

** BIPUNCTATA.** Antenne sub-fetaceous; nine joints black, and two points of the black feutellum white.

** G. Of doubtful Order.**

** INTERCUS.** Black; with yellow feet and subclavated antennae.

** RUMICIS.** Found on the dock.

** ULMI.** Found on the leaves of the wild elder.

** PRUNI.** Found on the plum-tree.

** LONICERÆ.** Brown, tomentose, shining, with subclavated antennae, and subferrugineous wings.

** POLYGON.** Black; antennæ subclavated with eighteen knots;
knots; the hinder margin of the segments of the abdomen
from the third to the fifth yellow-greenish; the thighs black;
the face anterior at the apex and the legs yellow; the hinder
at the apex black; the foles yellow; the linear abdomen
compressed.

TENTOLI, in Geography, a town of the island of Ce-
lebes, near the north extremity, on the west coast, which
gives name to a road. N. lat. 1°.

TENTORES, among the Romans, were persons ap-
pointed to hold the clothes of the charioteers that contended
in the circus.

TENTUGAL, in Geography, a town of Portugal, in
the province of Beira; 7 miles W.N.W. of Coimbra.

TENTYRA, or TENTYRS, in Ancient Geography, a
town of Egypt, and capital of a nome, which took the
name of Tentyris, according to Strabo, Pliny, Ptolemy,
and Steph. Bzy.

TENTZEL, William-Ernest, in Biography, a Ger-
am antique and historian, was born, in 1659, at Greußen,
in Thuringia, and finished his education at Wittemberg,
directing the course of his studies to philosophy and the Orient-
al languages, and also to history, both faceted and profane.
In 1685 he was appointed a teacher in the gymnasium at
Gottha, and entrusted with the care of the duke’s collection
of antiquities and coins. In order to qualify himself for
the more honourable discharge of his duties as historiographer
to the house of Saxony of the Ernestine line, to which
office he was appointed in 1696, he visited various courts in
Germany, and carried on an epistolary correspondence with
many distinguished foreigners. In 1702 he removed
to Drefden, where he was made historiographer to the elector
of Saxony, king of Poland, by whom he was honoured with
the title of counsellor; but his manners not being adapted
to a court, he obtained leave to retire. What remained
of his life was devoted to literary pursuits; and he died, very
poor, in November 1707, in his 49th year. His works
were numerous, among which we may reckon the following:
vice. “De Phenice,” Vitemb. 1682, 4to.; “De Ritu Lecc-
tionum Sacrorum,” Vitemb. 1685, 4to. a work highly
commended by Bayle; “Judicia Eruditorum de Symbolo
Athanasi a fluendo collacque et inter fc collata,” Franc.
et Lpf. 1687, 12mo.; “Animadversiones in Cascimir Or-
dine Supplementum de Scriptoribus Ecclesiasticis,” 1688,
12mo.; “Cafparis Sagittarii Historici Saxonic Historia
Gotthana plenor, Æc.” Jena, 1700, 4to.; “Supplementum
Historie Gotthana,” ibid. 1701, 4to.; “Supplementum
Hitt. Goth. fecondum,” ibid. 1701, 4to.; “Saxonia Nu-
mifmatica, Pars I.” Francet et Lpf. 1705, 4to.; “Pars II.”
1705. Tentzel was also a contributor to several literary

TENUIROSTRE, in Ornithology, the name of a genus
of small birds, which feed on insects, and have slender
and sharp beaks; of this genus are the lark, swallow, red-breast,
and a number of others. Ray’s Ornithology.

TENUNE, in Geography, a town of Arabia, in the
province of Nedsjed; 40 miles N. of Aniza.

TENURE, in Agriculture, the manner in which pro-
prieters and tenants hold their lands, &c. of their land-
lords, or other persons.

It may be noticed, that the tenures of lands are extremely
various in almost every district of the kingdom, being, how-
ever, chiefly freehold, free-farmhold, copyhold, long-leasehold,
or life-leasehold, though there are many other local forms of
tenures of land.

The freehold is most probably in the largest proportion over the whole country, the copyholds in the next,
and the leasehold tenures in the smallest extent. It

has been remarked in the Shropshire Agricultural Report,
that it appears beautiful in theory, that there should be one
rule of descent in a kingdom only, one tenure of property,
and one scale of political rights; but that it may be doubted
whether so much uniformity is suitable to an imperfect state;
or at least to our present degree of improvement. At all
events, irregularities that are not attended with much prac-
tical inconvenience, should not be pointed out as obnoxious,
in a scheme that has produced so much positive happiness,
and so much comparative good, as the constitution of these
kingdoms has afforded.

It is stated too, in the Agricultural Survey of Essex,
that freehold estates are the most valuable to the immediate
proprietor, there can be no doubt; but the purchase of a
copyhold may remember, that the original purchase is by far
much the lower; and whether he lets the occupation to a
tenant, or farms and cultivates it himself, he may possibly
make as good interest of his capital as if he had bought a
freehold. Perhaps, also, its general and final utility to the
public, may be nearly or quite the same. This, the writer
thinks, is certain, that copyhold estates, whether in the hands
of the proprietors or tenants, are as well cultivated as the free,
excepting only in the article of timber, and even in that the
difference is seldom visible. The like may be said of leave-
hold estates, and even of those in mortmain.

In Hertfordshire, where a large portion of the property
is held by copyhold tenure, with a fine certain or at the will
of the lord, but which fine never exceeds two years’ rent,
the land falls at about six years’ purchase under the price of
freehold, according to the Report of the rate of agriculture
for that district. And it is further suggested in the latter
of the two former of the above agricultural surveys,
that, with regard to the tenures by which the more tempo-
rary occupiers hold their farms, they are, as already ob-
erved, extremely various, some upon leases of longer or
shorter duration, some without any lease at all, agreeably
to the taste and pleasure of the landlord, though by far the
greatest number, especially of those in the possession of the
smaller proprietors, are let upon leases of from eight to ten
to twenty-one years. And it is observed, from what has
been done in Norfolk and other counties where the tenures
are of more length, as from seven to twenty-one years,
that the improvement of the land is much connected with the
practice of such tenures. And it is likewise suggested in the
Gloucester Report on Agriculture, that it would be much
more advisable for the counties and farmers, and probably be one result of the labours of
agricultural societies.

Some suppose the freehold tenure to possess the most
numerous advantages, with the fewest inconveniences, of any
form of holding. But many are of opinion that some other
class is equal to it, or nearly so. The forms of tenure
throughout most of the southern parts of England, are prin-
cipally those of the freehold, copyhold, life-lease, church-
lease, and college-lease kinds, both for lives and years.
In Cornwall they are for the most part freehold, with the ex-
ception of the lands of ecclesiastical corporations and ancient
duchy land, which is equivalent to copyhold in fee, held
under the duke of Cornwall, subject to a small annual rent.
This form of land passes by surrender in the duchy courts,
nearly in the same form as other copyhold lands. But the
modern duchy is different from the above; the occupiers
being leaves under the duke, and, in general, are purchasers
of an interest in the land during the continuance of the
longest lives of three lives, the consideration being, in part,

more famous and extensive plan is generally approved in this parish, and it is a general rule that the parishes in this district have been divided into three classes, viz.:

1. The first class comprises those parishes where the number of tenants exceeds the number of tenants in the second class.

2. The second class comprises those parishes where the number of tenants equals or exceeds the number of tenants in the third class.

3. The third class comprises those parishes where the number of tenants is less than the number of tenants in the second class.

It is observed that the number of tenants is very large in some parishes, while in others it is comparatively small. In some parishes, the number of tenants is almost equal to the number of inhabitants, while in others it is much smaller. The number of tenants varies greatly from one parish to another, and it is found that in some parishes the number of tenants is very much greater than in others.

In the parishes of Edinburgh, Fife, and Stirlingshire, the number of tenants is very large, and in some cases it is even larger than the number of inhabitants. In the parishes of Lanarkshire and Ayrshire, the number of tenants is comparatively small, and in some cases it is very much smaller than the number of inhabitants.

The number of tenants is also very variable in the parishes of the Lowlands and the Highlands. In the parishes of the Lowlands, the number of tenants is generally larger than in the parishes of the Highlands, and in some cases it is even much larger. In the parishes of the Highlands, the number of tenants is generally smaller than in the parishes of the Lowlands, and in some cases it is very much smaller.

It is observed that the number of tenants is also very variable in the parishes of the south and west of Scotland, and in some cases it is much larger than in others. In the parishes of the south and west of Scotland, the number of tenants is generally larger than in the parishes of the north and east of Scotland, and in some cases it is even much larger.
The common tenures at this day are, free-simple, free-tail, by courtesy, in dower, for life, or for years, or by copy of court-roll.

Tenure, Barons by ancient. See Baron.

Tenure. Disfigure of, is a species of injury which consists in breaking that connection which subsists between the lord and his tenant, and to which the law pays so high a regard, that it will not suffer it to be wantonly disfigured by the act of a third person. If, therefore, there be a tenant at will of any lands or tenements, and a stranger, either by menace or threats, or by unlawful diligence, or by fraud and simulation, or other means, contrives to drive him away, or inveigle him to leave his tenure, this the law very justly considers to be a wrong and injury to the lord; and gives him a reparation in damages against the offender by a special action on the case.

—Blackl. Com. vol. iii.

Tenute, Ital. in Magie, generally written ten, from the Italian term tenere, to hold on, fulfill to the last moment of a note's duration. See Sostenuto.

TENYA, in Geography, a town of Africa, in the country of Fouta. N. lat. 16° 15'. W. long. 10° 25'.

TENZANG, a town of Corea; 13 miles E.S. of King-ki-tao. TENZEGZET, a town of Algiers; 16 miles S. of Trencenu.

TENZYN, a town of Poland, in the palatinate of Cracow; 20 miles W. of Cracow.

TEOATZINCO, a town of Mexico, in the country of Tlascalca, where a bloody battle was fought between the natives and the Spaniards under Cortez; 20 miles E. of Tlascalca.

TEOLO, a town of Italy, in the Paduan; 7 miles S.S.W. of Padua.

TEOLY, a town of Hindoostan, in the cirque of Ghând; 15 miles S.E. of Gujarat.

TEOAH, a small island in the Soloco Archipelago. N. lat. 6° 15'. E. long. 120° 51'.

TEONA, a small island near the west coast of Scotland. N. lat. 56° 4'. W. long. 5° 52'.

TEOPISCAN, a town of Mexico, in the province of Chiapa; 60 miles S.E. of Chiapa dos Espagnols.

TEOS, in Ancient Geography, a town of Acha Minor, in Ionia, on the southern coast of a peninsula, which became an island when the sea was high or much agitated. It was situated over-against the Isle of Samos, S.W. of Smyrna, and E. of the promontory of Coryccon. It is celebrated for having been the birth-place of Anacreon. The inhabitants were renowned for their courage: they preferred abandoning their city to living under the tyranny of the Persians. Teos was treated with mildness by the Roman emperors. Bacchus had a magnificent temple here, which Vitruvius has particularly described. Here also was held a general council for the management of all the affairs of Ionia, because this city was in the centre of Ionia.—Alfo, the name of a town of Scythia.

TEOWENISTA CREEK, in Geography, a river of Pennsylvania, which runs into the Alleghany, about 3 miles below Hickery.

TEPA. See TAROATHELETOOMO.

TEPEACA, in Geography, a town of Mexico, in the province of Tlascalca; 15 miles S.S.E. of Puebla de los Angeles.

TEPEGUANA, a district of New Brazil, situated on the Nazas.

TEPHELLENE, a town of Albania, the birth-place and favourite residence of Ali, situated on the banks of a river which at the distance of 60 miles from the sea appears to be as broad as the Thames at Westminster bridge. The streets of the town, containing about 400 ill-built houses, are extremely dirty; but the palace of the vizir is very magnificent.

TEPE-MAXTLATON, in Zoology. See Felis Tigrina.

TEPETISTAC, in Geography, a town of Mexico, in the province of Guadalajara; 60 miles N. of Guadalajara.

TEPETOTOTOYI, in Ornithology, the name of a Brazilian bird of the gallinaceous kind, more usually called mitopiranga. See Chas. Ador.

TEPHILIA, or TEPHIL, in Ancient Geography, a town of Acha, in the vicinity of Media.

TEPHIRIA, in the Natural History of the Ancients, a name given to the grey ephelites.

TEPHERICA, in Ancient Geography, a town of Acha, in the neighbourhood of Gilicia and Armenia.

TEPHROMANTIA, in Geography, a town in Lycia, of the same name as the species of divination, performed with shells; for which see Potter, Archæol. Græc. tom. i. p. 353.


Ten. Ch. Col. Perianth inferior, of one leaf, deeply divided into five straight, awl-shaped teeth; the upper ones rather the shortest; the lowest rather longer than the rest. Cor. papilionaceous. Standard recurved, large, roundish-obovate. Wings half-ovate, obtuse, straight, slightly shorter than the standard. Keel broad, rounded, gibbous, compressed, the length of the wings. Stem. Filaments ten, all firmly united along the middle into a membranous tube; the tenth separate at the base, and at its upper half; all papillar and distinct at the extremity, somewhat unequal in length; anthers terminal, uniform, ovate-oblong. Pip. German falcate, oblong, compressed, very hairy; style awl-shaped, angular, ascending, hairy along the back; stigma simple, recurved, slightly hairy. Peric. Legume oblong, compressed, hairy, transverse that falcate or ascending, of two valves and one cell. Seeds several, compressed, kidney-shaped, rather angular, slightly separated from each other by thin imperfect, membranous partitions.

Eff. Ch. Calyx with awl-shaped, nearly equal, teeth. Stamens all connected. Legume compressed, rather coriaceous, of one cell, with many seeds. Stigma acute.

Obb. We have taken our characters from one certain species, T. virginiana, comparing it with authentic original specimens of Mitchell's Erébintius, which Linnaeus thought the very same species, but in this he was certainly mistaken. It appears to be Mr. Pursh's third species, T. bipusula; and as far as we can judge, from specimens that will not admit of distinction, and from Mitchell's description, it is probably of the same genus, for Mitchell might overlook the partial union of the flaments, even supposing that character to exist in his plant. If we were certain of this, his name ought, by every right, to be preferred to the more modern one of Perfoon. (See Erébintius.) The genus moreover is improperly placed in the sixth section of Diadphila, while its essential character indicates that it belongs to the first.

and shaggy. Leaflets numerous, oval-oblong. Clufter terminal, many-flowered.—In dry sandy woods, from Ca-
 nada to Florida, flowering in June and July. Root peren-
nial. Plant about a foot high. Flowers very handsome, 
rofe-coloured and yellowish-white. Pursh. The flmen is 
simple, leafy, angular, brown, clothed with hoary pu-
befcence. Leaves alternate, nearly fefile, pinuate, of from 
17 to 21, not quite opposite, entire leaflets, each about an 
inch long, hairy on both sides, tipped with a minute point. 
Clufter solitary, various in length, compofed of numerous 
large flowers, not unlike those of a Lupine. Calyx defely 
hairy. Legume an inch and a half long, pointed, linear, 
hairy, somewhat undulate, and a little curved upward, 
tumid where the seeds are lodged. Miller appears to have 
cultivated this plant in 1765. We have never feen a living 
fpicimen. That we have here defcribed was fent by Kalm 
to Linneus. The legumes came from Jacquin's herbarium.

n. 2. (Galega villofa; Michaux Boreal-Amer. v. 2. 67? 
Purbs.)—Proflrate, downy. Leaflets five, somewhat wedge-
fpaped, very obtufe. Flower-flalks opposite to the leaves. 
Legume nearly fhrutant.—Gathered in Georgia by Mr. 
Effen, flowering in July and August. Perennial. Leaf-
lets wedgefpaped-ovobate; smooth above; fiky at the back. 
Stalks elongated, bearing about three purple flowers. 
The fingular circonfance of the nearly fefile leaves gives it
the appearance of a trifoliate plant, the lower pair of leaflets 
refembling trifolius. Michaux's fynonym is rendered doubtf-
ful by his not mentioning the small number of leaflets, one 
of the moft striking characters. Purbs.

(Galega fipidula; Michaux Boreal-Amer. v. 2. 68. G. 
fpicata; Walt. Carol. 188. Erbfinthus; Mitch. as above. 
Clitoria, n. 3; Linn. Hort. Cliff. 148, excluding the very 
erroneous reference to Burmann.)—Slender, difpafe, downy. 
Leaflets numerous, oblong-elliptical, abrupt, pointed. 
Flower-flalks opposite to the leaves. Legume falcate, hip-
fid. — In pine woods and on flate hills, from Virginia to 
Georgia. Perennial, flowering from July to September. 
Leaflets 13 or 15. Stalks elongated, bearing from three to 
five pale-red flowers. Purbs. Every part of this defcrip-
tion answers to the original fpecies of Mitchell's plant, 
but he, as well as Linneus, speaks of the tenth flamen as 
being really separate from the ref. We cannot from our 
fpecies determine this point. The flmens are long, 
branching, trailing, round, and hairy. Leaflets with ftrong 
oblique tranfeverfe veins; fonfemetimes smooth above; alýs 
fiky beneath; their length about an inch. Brachs lance-
olate. Calyx very biflty. Perhaps the union of the tenth 
flamen to the ref, which is not in the ufual mode continued 
quite to the bafe, even in T. virginiana, may exift, lefs, or 
not at all, in the fpecies before us, and yet the plants may 
together confitute one natural genus.

TEPID, in Natural Hiilory, a term used by writers on 
mineral waters, to express fuch of them as have a lefs fen-
fible cold than common water.

They diftingufh all the medicinal fprings into three 
kinds; the hot, the tepid, and the cold; but the middle 
term might eafily be misunderufold to mean a great deal 
more than they exprfs by it: all that have what can be 
called the lefl fufible warmth, are called hot; and the 
tepid are diftinguifhved from the abfolutely cold, only by 
their being lefs cold.

Some of this clafs of mineral waters, and fome few alfo 
of the cold ones, have a fharpfih vinous taffe, which is 
never obferved in any of the hot ones. This taffe is loft 
on giving the waters the flighest heat, and is therefore very
difficult to be gueffed at as to its origin. It is not only 
found in the aluminous and vitrilate waters, but afo in 
thofe which are manifeftly nitrous, and which abound 
in fulphureous falt, quite different in their nature from acids.
It is therefore an additional fomewhat, quite diflinct 
from the fainie properties of the fluid, and as easily connected 
with one kind of that as with the others.

The cafe of heat in the mineral waters remains yet 
wholly unknown, notwithstanding all that has been written 
concerning it. It is hard to beleive, that there are con-
tinual fubterranean fires near enough the surface, to give 
a heat that preserves itself in fo great a degree to the very 
place of their eruptions; and it is equally hard to conceive, 
that there can be beds of fermenting mineral matters, fuffi-
cient in quantity and force to have given the fame degree 
of heat to waters for fo many ages, as fome of our hot fprings 
are known to have fubfifted. Duclos's Exan. des Eaux 
Miner.

TEPIDARIUM, among the Romans, a tepid or 
blood-warm bath, which was joined to the cold and hot 
baths, and was a medium between the two; fo that if any 
perfon wanted to go from the hot to the cold bath, or vice 
verfa, he always took the tepid bath in his way.

TEPIQUE, in Geography, a town of Mexico, in the 
province of Xalifico; 5 miles N. of Xalifico

TEPIRUS, a town of South America, in the province 
of Tacuman; 18 miles N.W. of St. lago del Eftero.

TEPKAS, a Ruffian ftettlement in North America, on 
the eait side of Beering's fruit. N. lat. 66°. E. long. 
112° 4'.

TEPLITZ, a town of Bohemia, in the circle of Leit-
meritz, celebrated for its warm baths, discovered in 762;
14 miles W.N.W. of Leitmeritz. — Alfo, a town of 
Croatia; 8 miles S. of Varadin.

TEPOW, GREGORY NICOLAUCUTSCH, in Biography, 
a Ruffian writer, educated in a,feminary at Novgorod, 
where he diftingufhed himfelf by a Latin tranflation 
of prince Cantemir's Satures, and a work on the geography of 
Ruffia, neither of which was ever printed. In 1740 he 
was employed in the Academy of Sciences, and in forming 
a catalogue of objects contained in the Cabinet of Natural 
History. He thus acquired a taste for that fcience, and 
particularly for botany; in confequence of which he was 
made an adjuft of the Society in 1741, and in the following 
year delivered lectures on moral philosophy, that were 
much approved. The emprfs Elizabeth appointed him 
tutor and travelling companion to her favourite, count 
Rafumoufky, who, on his return from his travels in 1746, 
as made prefident of the Academy of Sciences. Teplow 
then became an honorary member, directed the infitution 
in the name of the prefident, and drew up rules for its 
better regulation. At the time of the emprfs's death he was 
a counfellor of ftate; but as he was an enemy to Peter III., 
he was arrefted: afterwards he was reflored to favour; nev-
etherlefs, two months after his being made a member of the 
council of ftate, it was discovered that he had joined in a 
dsfiracy to dethrone that unfortunate prince. After the 
depofition of Peter, he publifhed appearances, in order to 
render him odious, and, as Bufching fays, was the princi

TEPID, in Natural History, a term used by writers on 
mineral waters, to express such of them as have a less sensible cold than common water.

They distinguish all the medicinal springs into three kinds; the hot, the tepid, and the cold; but the middle term might easily be misunderstood to mean a great deal more than they express by it: all that have what can be called the least fusible warmth, are called hot; and the tepid are distinguished from the absolutely cold, only by their being less cold.

Some of this class of mineral waters, and some few also of the cold ones, have a sharpish vinous taste, which is never observed in any of the hot ones. This taste is lost on giving the waters the slightest heat, and is therefore very

TEPOTI, in Geography, a river of Paraguay, which runs into the Paraguay.

TEPPREWODA. See Tupperwoda.

TEPERTE, a name originally Tartarian, and signifying a man who cannot pay his taxes, given by the Russians to a peculiar tribe formed of Finns and Tartars in the middle of the 16th century, during the dislocation of the Khazan-Tartarian empire. They established themselves at first in that part of the Ural mountains, which belongs to the government of Ufa. At present they are too much intermingled, that their origin is scarcely discernible. They are found to increase in number at every succeeding census. In the year 1762, about 34,000 of them paid the imposts.

TEPTON, in Geography, a town of Tibet; 30 miles N.W. of Szigatchee.

TEPWIA, a town on the W. coast of the island of Celebes. S. lat. 19° 4'. E. long. 110° 10'.

TEQUENDAMA, a cataract near Bogota, the capital of New Granada (see Bogota), which, according to Bouger, is one of the highest in the world, being 250 or 300 fathoms in height, and its fall vertical. Its real height is probably about 1520 feet. The river Funza, which is here very considerable, falls along a narrow channel, on a high table land, and is poured as from the front of a vale, in one arch of the enormous height above specified, the noise being heard at the distance of seven leagues. This fall is received in a vast cauldron of more than a league in circumference; and the quantity of water, and violence of its descent, form a continual mass of clouds, which renders it fearfully visible in the evening; but in the morning it is more striking, being decorated with numerous rainbows according to the position of the spectator. The falls rocks which form the cauldron also excite admiration, being as regular and polished as if cut with a chisel; the surrounding heights are covered with trees, shrubs, and flowery plants, while the splendid appearance of some of the birds, and the music of others, render the cataract of Tequendama alike sublime and beautiful.

TEQUERA, a town in Mexico, in the province of Mechoacan, on a river near the Pacific ocean; 80 miles S.E. of Zacatula. N. lat. 17° 50'. W. long. 102° 20'.

TEQUERY BAY, a bay on the south-east coast of Cuba, near Cape Cruz.

TEQUIA, a town of New Granada; 32 miles S.W. of Pamplona.

TEQUIXUICATZANATL, in Ornithology. See

| Gracula | Quiscalus |

TER, in Geography, a river of Spain, which rises in the county of Cerdagne, and runs into the Mediterranean, about 20 miles E. of Gerona.

TERA, a small river of Spain, which runs into the Orbega, in the province of Leon.

TERACE, in Rural Economy, a term provincially applied to a coarse hair sieve, for separating the inferior flour from the bran.

TERAIN, in Geography, a river of France, which runs into the Ofle, near Creil.

TERAKAKO, a peninsula on the east coast of New Zealand, of which Cape Table forms the eastern point.

TERAMNUS, in Botany, so called by Browne, apparently in allusion to its delicately-shaped legume, terebra, being used particularly to express the tenderness of eatable pule: algae rustii was a weed hostile to leguminous plants.—Browne Jam. 290. Swartz Prodr. 105. Ind. Occ. 1238.

TER, in Geography, a river of Paraguay, which runs into the Paraguay.

TEREE, a town of Egypt, on the west branch of the Nile; 18 miles N.W. of Cairo. N. lat. 36° 50'. E. long. 35° 45'.

TERANO, a town of Naples, in Calabria Citra; 5 miles W. of Bingsnano.

TERAPSARSUK, a town of East Greenland. N. lat. 59° 55'. W. long. 45°.
TERASBURG, a town of Austria; 2 miles N. of Eppenburg.

TERATOSCOPIA, formed of τέρα, prodigy, and σκοπεῖν, I consider, a kind of divination by the appearance and view of monsters, prodigies, spectres, and phantoms.

TEREDO, in the Materia Medica, a name given by Avicenna to the tubāb, a purging drug, mentioned by all the authors of his time; but, in general, in a very confused manner.

Garcias tells us, that the Indians use it to purge phlegm, and that they add ginger to it by way of corrective; and Avicenna says the same thing of its use in his time.

TEREBURGH, Gerard, in Biography, a painter of domestic scenes of exquisite skill, was born at Zwoll, in the province of Overijssel, in 1628, the son of a painter little known, from whom he received the rudiments of the art. He began his career as a painter of portraits in small, and had acquired considerable reputation, when he determined upon travelling through Germany and Italy. Unengaged by the sublime beauties of art which the latter country offered to his view, he never changed his style, but went thence to Paris to practice it; and there met with considerable success. From thence he returned to Holland, and was highly appreciated, and fully employed. He attended the congresses assembled at Munster in 1648, for the negotiation of the treaty of peace, and there painted his celebrated picture containing portraits of the plenipotentiaries and principal personages assembed on that occasion, which is regarded as his master-piece; and of which there is a print by Suyderhoef. While engaged upon this work, he was invited by Count Pigorando, the Spanish ambassador at the congresses, to visit Spain, and went there in consequence; where he was most favourably received, and much employed. The king conferred upon him the order of knighthood, and rewarded him munificently for the pictures he painted. Besides portraits, which constituted the principal part of his practice, he frequently painted conversations, musical parties, ladies at their toilettes, and domestic subjects, which he executed with a free, but rather a heavy pencil, not equal to the brilliancy of Metzu and Netscher, but nevertheless exceedingly meritorious and agreeable; particularly in the close imitations of his draperies. He died in 1681, at Deventer, where he settled on his return from Spain.

TRECERA, or Terecia, in Geography, one of the Azores islands, suppos'd to have derived its name from its standing the third in this cluster of islands in point of situation, though the first in dignity, as appears from a number of circumstances, and particularly from its communicating its name to the rest. This island is computed at 34 miles in circumference, and about 25 miles in length, by 15 in medial breadth. Its figure is almost circular, the coasts high, and so surrounded with craggy rocks, that it is deemed impregnable; every accessible part on the coast being defended by strong forts, heavy cannon, and a numerous and regular garrison. The only tolerable port in the whole island is the harbour of Angra. The island of Terecia is fertile, pleasant, and healthy: the very rocks, which elsewhere are dry and barren, produce here excellent vines, though not equal to those raised in the Canaries and Madeira. The land yields large crops of wheat and other grain, pasture for cattle, and a prodigious variety of lemons, oranges, and all those fruits peculiar to hot and cold climates, which are observed to be propagated to the greatest advantage in temperate countries. Besides Angra, there are several other towns and large villages in Terecia, with a number of forts and garrisons, under the direction of the governor, who has the power of filling up all vacancies that happen among the military officers. N. lat. 38° 45'. W. long. 27° 6'.

TRECERO, a small island in the Atlantic, near the coast of Sierra Leone.

TRECERO, a river of South America, which rises in Tucuman, and joins the Salado on the borders of Paraguay.

TERCHIZ, or Teresh. See Turush.

TERCHOUZ, in Orvithology. See Upupa Epops.

TERDINA, in the Materia Medica, a name by which Paracelsus, and some other authors, have called the great garden-valerian. Ger. Emac. Ind. 2.

TERDOPIO, in Geography, a river of Italy, which runs into the Po, 12 miles E.S.E. of Lumbello.

TEREBELLA, in Natural History, a genus of the Mollusca order of Vermes; the characters of which are, the body oblong, creeping, naked, furnished with branchiae at the sides, more frequently in the tube; the mouth habituated, toothed, and projecting a clavated probosces; the tentacula or feelers about the mouth numerous, capillary, and ciliated. Gmelin enumerates eleven species.

CIRRATA. Round, body with triple lateral penaeis. Found in the sandy bottom of the Iceland sea.

LAPIDARIA. With eight cirri at the anterior parts of the body, about the mouth four. Found in the Mediterranean sea, within the clefts of rocks.

CONCHILEGA. Whitish, with numerous filiform cirri at the mouth, the upper longest; the branchiae very red. Found in the sea washing the coast of Holland.

COMPLANATA. Depressed, mouth with four cirri; the lateral pencil-bearing warts of the body arranged on both sides in a two-fold series.

CARNICULATA. Depressed-quadrangular, with a four-fold series of penaeis from the body, and palate elongated. Found in the American and Indian seas.

ROSTRATA. Tetraedrous, with a quadruple series of penaeis from the body, and palate elongated. Found in the Indian sea.

FLAVA. Depressed, with thirty-seven branchiae on both sides, and bifurcated tail. Found in the Indian sea.

RUBRA. Red, depressed; tail terminating with two cirri; the head with two horary movable jaws. Found in the sea surrounding the islands of Zealand.

APHRODITIS. Round, gradually attenuated backwards, below somewhat depreased with an oblique furrow; no branchiae in the eight first segments, in the following three simple, in the last fcnibly greater, one being turned, pin nated. Found in the Indian sea.

BICORNIS. With a simple terminal two-horned dife of the proboscis. Found in the America ocean.

STELLATA. With a perforated triple dife of the proboscis; the anterior armed with a truncated horn, radiated with prickles. Found in the American ocean.

TERRIBELLA, (dim. of terebra,) in Surgery, a trepan, or circular saw, for removing portions of the skull.

TREBIA, in Ancient Geography, a town of Asia, in the Greater Armenia, E. of the sources of the Tigris.

POLEMY.

TREBINACEAE, in Botany, the 94th order in Jullien's system, the 12th of his 14th class, so denominated from the genus for which he choos'd to retain the old name of Tetranchis, but which is the Pylacia of Linnaeus. Many of the plants of this order abound in an essential oil of the nature of turpentine, or something like it. The characters are as follow.

Calyx
Calyx of one leaf, inferior, with a definite number of segments. Petals definite in number, (rarely wanting,) inserted into the lower part of the calyx, alternately with its segments, with which they agree in number. Stamens either the same number, alternate with the petals, or twice as many, inserted into the same spot. Germania superior, either simple, or more than one, of a determinate number. When the germen is single, the style is solitary, (rarely deficient,) with a simple or a divided stigma; when there are several germen, the stigmas equal them in number. Fruit either capsular, a berry, or a drupa, of one or more single-seeded cells. Where there are several germen, there are as many styles, or simple stigmas; and the same number of distinct single-seeded capules. The seeds are generally lodged in a bony nut. The corculum is without an albumen, its radicle lateral, and reflexed upon the lobes. Stem arborescent or shrubby. Leaves alternate, without stipules, either simple, or ternate, or pinnate with an odd leaflet.

Section 1. German simple. Fruit of one cell, with a solitary seed.

This comprises Caffuous of Jussieu and Lamarck, which is the Linnaean Anacardium; Anacardium of the same authors, which is Semeacrus of Linnaeus; Magnifera; Conacrus; Rhus; and Rourea of Aublet, Schreber's Robergia.

Section 2. German simple. Fruit of many cells, some of which are occasionally abortive.

Canarium; Rambha; Canondalia; Camaraurium; Leica of Aublet; Amyris; Toddalia, which is Castanea of Schreber; Spondia of Sm. Plant. Ic. (see Spondia); Sinus; Spathelia; Terebinthus of Tournefort and Jussieu, the Linnaean Pilassonia; Buraja; Tolufera; Tapiria of Aublet, which is Schreber's Juniquia; Porphyria of Commerson, perhaps not different from our Spondias Magnifera; and Spandias itself, compose this section.

Section 3. German several. Fruit of many single-seeded capules.

Here are only three genera: Simaba of Aublet, which is Schreber's Zuingera; Atyanthus of Desfontaines; and Brueca of L'Heritier.

Section 4. Genera akin to Terebinthaceae, but differing in being furnished with a flabby albumen, which brings them near to Rhamni; see that article.

Caffus of Jussieu, Lamarack Ilustr. t. 387; Fagara; Zanthoxyla; and Pilosa.

Section 5. Genera akin to Terebinthaceae, and (like the true plants of this order) definite of a flabby albumen.

Dodonca; Averhoa; and Inglesla.

Jussieu announces an intention of dividing this order into Caffus, true Terebinthaceae, and Zanthoxyla; the first having simple leaves, a single-seeded fruit, and an ascending radicle; the second generally pinnate or ternate foliage, a drupa with several single-seeded nuts, and a defending radicle; and the third pinnate or ternate foliage, mostly marked with pulvini dots; fruit of many cells or many capules, each with foliaceous seeds; and a flabby albumen surrounding a straight corculum. A fourth order would arise out of certain genera now intermixed with the rest, but not properly coming under any of the three just defined, being themselves perhaps entitled to lay the foundation of future orders, not as yet discovered.

TEREBINTHINA, in Medicine, Natural History, &c. See Terebinthine.

TEREBITHUS, in Botany. τερεβίθος: of Dioscorides. See Pistacia and Terebinthaceae.

TEREBOTIN, a word used by Paracelsus for the common turpentine.

TEREBRA, from τερεβρα, to bore, a trepan, or trephine. Vol. XXXV.

Also, an instrument called a perforator, such as is contained in the generality of cafes of trephining instruments, and is used for making a hole, in which the centre pin of the trephine is to work.

TEREBRATULA, in Natural History, a name given by Mr. Llloyd and Guatier to some species of the smooth conchae anomiotes, which have near the head of the shell a small hole, which looks as if bored by art. See CONCHAE Anomiates, and Shiells.

TERECOL, in Geography, a town of Hindostan, in Concan; 16 miles N.N.W. of Goa.

TEREDO, in Natural History, a genus of the Terebratalo order of Vermes, the characters of which are, that the animal is a terebella, with two hemispheric calcareous valves, cut off before, and two lancedolate; the shell is round, fuscous, and capable of penetrating wood. Gmelin reckons three

Species.

NAVALIS. The shell very slender, cylindric and smooth. UTRICULUS. Shell solid, cylindric and undulated.

CLAVA. Shell calcated at one end, the other curved, narrower, obtuse, and perforated in the middle.

The head of the Teredo navalis, called by Linnaeus Callitites navium, is well prepared by nature for the hard offices; it is to undergo, being coated with a strong armour, and furnished with a mouth like that of the leech; by which it pierces wood, as that animal does the skin: a little above this it has two horns, which seem a kind of continuation of the shell; the neck is as strongly provided for the service of the creature as the head, being furnished with several strong muscles; the rest of the body is only covered by a very thin and transparent skin, through which the motion of the intestines is plainly seen by the naked eye; and by means of the microscope, several other very remarkable particulars become visible there.

This creature is wonderfully minute when newly excluded from the egg, and at its utmost bigness is but a foot long; three or four inches are however its more frequent length.

When the bottom of a vessel, or any other piece of wood constantly under water, is inhabited and injured by ever so great a number of these worms, there is no sign of the damage to be perceived on the surface, nor are the creatures visible till the outer part of the wood is cut or broken away; then their shelley habitations come in sight: these lie near the surface, however, as to have an easy communication with the water, and there is a multitude of little perforations in the very surface through which the inhabitants injects throw out the extremities of their little shelley horns; there are of a reddish colour, and may be distinguished by an accurate observer in form of so many red prominent points; they all are retracted on the least touch, and are thrown out again as soon as all is quiet. From these points, or the small apertures which give them a way out, are the cells of the teredines to be traced. They are composed of an orderly or shelley matter, which forms a long tube with various windings and turnings, which mark the abode of the creature; but which usually neither adheres to the body of the animal nor to the wood. These cafes or tubes are always more or less loose in the wood, and there is ever a large space within them, for the body of the animal to be surrounded every way with water. They are very smooth on the inner surface, and somewhat rougher without; and are much harder and firmer in the cells of the older and larger animals than in those of the young ones.

These shelley tubes are composed of several rings, or annular

nular
cular parts; but these differ greatly in their length. There
is an evident care in these creatures, never to injure one an-
other's habitations; by this means each tubule or cañe is
preferred entire, and in such pieces of wood as have been
found eaten by them into a sort of honey-comb, there never
is a pailleage or communication between any two of
the tubules, though the woody matter between them often
is not thicker than a piece of writing-paper.

The vail increase of these animals, and their shelly tubules,
naturally lead to a consideration of the manner of their
generation: and when we consider that each of these crea-
tures is, from the time when it is produced from the egg,
immediately lodged in a cell, in which it lives without the
least possibility of getting into that of another animal of its
own kind, or receiving one of them into its own, it is not
easy to account for the propagation of the species in the
common way. This, however, is solved by an accurate
anatomical observation of the animals themselves, since in
every individual the parts of generation in both sexes, and
both the semen and ovula are found. Each individual there-
fore evidently serves by itself for the propagation of the
species; and this is probably very often the case in earth-
worms, and other of the hermaphroditic animals. All the
yet known kinds of these being soft-bodied; and probably,
though they often meet one another, and copulate in pairs,
yet when they have not opportunity, the parts copulate in
the individual.

Eggs are found in great plenty in the bodies of these ani-
mals in June, and are discharged with the water into the
sea, where the far greater part of them, doubtless, become
food for other small marine animals; and the few that affix
themselves to any piece of wood they are washed against,
hatch and get into its substance in the manner of their
parents.

The kind of wood in which these worms are lodged,
makes a great difference in the appearance of their cells, as
they work much more speedily and successfully in some kinds
than in others. The fur and alder are the two kinds they
seem to eat with the greatest ease, and in which they grow
to the greatest size. In the oak they seem to make but a
very slow progress, and usually appear very small, and
poorly nourished. The colour of their shelly tubules is often
brown in this wood; which seems plainly owing to the
effect of its juices.

Poisonous ointments are also found to be of some use in
destroying them, on rubbing over the wood: some have
thought that burning the surface was an effectual way of
preventing them, but this has been found to be otherwise.
The safest method of avoiding them in particular works,
is the using of bitter or very solid woods; the first kind they
are found never to touch, and in the other they make but
slow progress. Mixtures of lime, sulphur, and colchicum,
with pitch, for covering over the surfaces of boards, &c.
have been found of some use.

It seems very evident, that boards and other pieces of
wood have been subject to be eaten by these animals, from
time that we have any knowledge of; for the Rome called
Lupis Syringoides is evidently no other than these wood eaten,
petrified by long lying in the earth, together with the tubules
of the worms. The mases of this with the grain of wood
yet plain in them, are common in many places among fea-
hells, and other marine remains at great depths, and have
evidently been brought thither in very distant times, and
before those changes were made in the surface of the earth
of which we have no accounts in our earliest histories.

TEREDON, in Ancient Geography, a town of Asia, in
Babylonia, on an island which was formed by the Tigris at
its mouth. (Ptol.) Dionysius Periegetes places the town of
Terdon at the mouth of the Euphrates.

TEREK, in Geography, a mountain of Asia, between
Great and Little Bucharia.

Terck, one of the rivers that fall into the Caspian sea.
It originates in the Caucaidian mountains, runs at first
towards the W. and S., but turns afterwards entirely to the E.
and in about N. lat. 44°, and E. long. 65°, discharges itself
into the Caspian. It takes up in its course the Bafian, the
Malka, and the Sooana, among many other mountains,
and rivers. Its course lies properly in the Snow-
mountains of Caucasus, on the highest partition-ridges of
the frontiers of Georgia. It is rapid in its course; and
in the months of July and August, when the snow melts,
swells to the height of eight or ten feet above its usual
level in autumn, winter, and spring; overflowing its banks,
and inundating the adjacent country, forming for itself
new beds, and choking the old with sand. In its lower course,
as far as Kitzilari, it is almost entirely unaccompanied by
woods; farther up, to Starogladka, by a few; and thence
upwards, its banks are richly garnished with forests,
notably of oaks, wild fruit-trees, and a variety of others.
It does not freeze over every year, though in winter it abounds with driving ice. In this season its water is toler-
crably clear, which at other times, above Kitzilari, is turbid,
with earthy particles; but when taken up, it soon becomes
clear, and is then bright, well-tarred, and of good quality.
Below Kitzilari, the river has a less fall, and separates into
several arms, in which the parted stream flows so gently,
that it has time to deposit its earthy particles, which alter-
nately fill up these arms; so that one or the other occasion-
ally represents the main river. In the lower regions, on
the shores of the Terek, are seen vineyards, mulberry and
other fruit-trees, to which succeed salt-lakes, and springs
of the same nature. Its bed is formed mostly of sand and
clay. With regard to fish, the Terek, as well as all its
collateral rivers, is poor. Yet there are caught in it fur-
geon (acipenser fluviit), beluga (acipenser huo), ferrat-
us (acipenser stellatus, Pall.), plenty of salmon, fat-fish (cyp-
rinus chalcoides), carp, barbel (cyprinus barbus), shad,
pike, saduk (lucio pereca), perch (perca fluviatilis), lessas-
(cyprinus barba,) otters, beavers, tortoises, &c.

Terek, in Ornithology. See SCOLOPAX CINERA.

TERELLA, in Geography, a town of Naples, in the
Molie; 4 miles N. of Molie.

TERENTIUS, in Biography, a Latin writer of comedies,
was born, as it is supposed, at Carthage about the year of Rome 560 (B.C. 194.) Being
brought to Rome as a slave, when young, he was in the
service of a person named Terentiuss, a senator, from whom
he derived his name. The purity and politeness of his lan-
guage evince his having enjoyed the benefit of a good
Roman education. After his emancipation, he was ho-
noured with the friendship of several Romans of rank, such
as Scipio Africanus the younger, and the younger Lelus.
His comedies were founded upon the Greek model, and,
translated, either wholly or in part, from the Greek. The
first comedy which he is said to have brought upon the stage
was the "Andrio," represtented in the year B.C. 166.
But though this was the first of his comedies that was acted,
it appears that it was not the first which he had written.
The six comedies of Terence that are still extant were ex-
hibited at Rome from the year B.C. 166 to 160. They
were heard with great applause; the "Eunuchus" was
repeated twice in the same day, and he is said to have
received for it 8000 sesterces (about 64l.) Scipio and
Lelius,
T SENJABIN, in the Materia Medica of the Ancient Arabs, a word used to express a kind of manna called by some manna magellina, from its round globules resembling the drops of maltich, and by the physicians of many parts of the world at present, manna persicum, which see. See farther about this drug in Philos. Trans. No 472. vol. xliii. p. 87.

TERES LIGAMENTUM, in Anatomy, one of the ligaments of the hip-joint. See Extremities.

TERES LIGAMENTUM UTERI. See Generation.

TERES MAJOR and MINOR, two muscles of the shoulder, so called, because their figure is somewhat rounded.

The teres major (scapulo-humerien, le grand rond) is elongated and flattened, placed at the lower and back part of the shoulder, and extending from the inferior angle of the scapula to the posterior edge of the bicipital groove of the humerus. The latissimus dorsi, the skin, and the long head of the triceps, cover it behind; in front, it is covered by the latissimus, the axillary vessels and plexus of nerves, the short head of the biceps, and the coraco-brachialis. Its upper edge corresponds first to the teres minor, then is separated from that muscle by the long head of the triceps, and lastly corresponds to the subcapularis, from which the circumflex vessel and nerve separate it. The lower edge, covered by the skin, forms, with the latissimus, the border of the axilla.

The inferior or external extremity of the muscle is fixed to the external surface of the inferior angle of the scapula, and to the neighbouring part of its lower edge: thence it ascends, passing obliquely outwards, retaining nearly an uniform breadth (about three fingers) throughout; and is attached to the posterior margin of the bicipital groove. The latter attachment takes place by means of a flattened tendon, about an inch broad, which corresponds in front to that of the latissimus dorsi.

There is a small bursa subacuta between its posterior surface and the humerus. It lines the bicipital groove by some fibres, which meet those of the pectoralis major. Muscular fibres arise from the outer surface and inferior angle of the scapula, from the lower portion of the inferior costa, and from a septum between this muscle and the infraspinatus; and they terminate on the tendon just described. It carries the arm backwards; depresses it when it has been raised; rotates the humerus on its axis, so as to turn the arm inwards or forwards. In conjunction with the latissimus, and pectoralis major, it will fix the arm against the side. It will pull the scapula forwards or upwards to the arm, when that is fixed.

Teres Minor (petit rond) is a small elongated muscle, lying at the posterior and under part of the shoulder, extending from the inferior edge of the scapula to the external tubercle of the humerus. Covered behind by the deltoid and skin, it covers in front the edge of the scapula, the infrascapular artery, the long head of the triceps, and the orbicular ligament of the shoulder-joint. Its upper edge is either continuous with the infraspinatus, so that they form but one muscle, or is separated from it by a cellular line. Towards the back part there is an aponeurotic septum between them. The lower edge is close to the teres major behind, but separated from it anteriorly by the long head of the triceps. The lower or posterior extremity is small and pointed, and begins its attachment to the scapula, just where that of the teres major ends, between the latter muscle and the infraspinatus: it passes obliquely upwards and outwards, fixed to the lower and outer edge of the scapula, and is inserted in the lower or back part of the great tubercle of the humerus. This insertion is effected by means of a tendon, closely connected to that of the infraspinatus, differing some of its fibres on the orbicular ligament, and receiving the feathery fibres in all directions from the origin of the muscle. Its action has exactly the same effect with that of the infraspinatus; which see.

TERES FOLIUM, in Botany. See Leaf.

TERESA, or THERESA, in Biography, a saint in the Roman Catholic church, was born, of a noble family, at Avila, in Old Castile, in March 1515. Her father, by reading the lives of saints to his family, inspired her, at an early age, with an enthusiastic fervour, which induced her to clothe with one of her brothers, to seek martyrdoms among the Moors. When they were brought back, they induced the same passion by constructing little hermitages in the garden, whether they retired to perform their exercises of devotion at twelve years of age. Terefa left her mother, and was boarded in an Augustine convent, and this situation prevented her being seduced by the pleasures of the world, for which she began to indulge a propensity in consequence of reading romances; but for her farther security she took the veil in the Carmelite monastery of the Incarnation at Avila, in her twenty-second year. Her person was beautiful, and attracted the admiration and love of all who saw her; but her religious ideas, though tender and rapturous, were austere; and perceiving that the discipline of the house in which she resided was relaxed, she undertook a reform of the Carmelite order. After much opposition, she succeeded in establishing the
first monastery of the female reformation at Avila, in 1562, and
having extended her plan to the religious males of the order,
the foundress in 1568 the monastery of Dorrello, which was
the origin of the more rigid, or barefooted, Carmelites. Her
zeal and almsgiving enabled her to found thirty religious
houses of the reform, fourteen for men and sixteen for
women; and after her death it extended through all the
Catholic countries of Christendom. Teresa died at Alva in
October 1582, in the 68th year of her age. She was
 canonized by Gregory XV. in 1621; and afterwards be-
came the patron saint of Spain. See Carmelites.

Teresa, in Geography, a town of Spain, in the province
of Valencia; 10 miles N.W. of Segorbe.

TERELSA. See Teresa.

TERETES, in Horae, one of the three sorts of worms
which infest the bodies of them, and which are very trouble-
some and injurious. See Ascariides, Bots, and Worms.

This sort of worm, which is found in horses, resembles the
common earth-worms in many respects, being only sharper
at both ends, callous towards the middle, and they do not
contract or dilate themselves so easily. Some of these, which
have been seen to come from horses, hinder them from thriv-
ing till they are dislodged by proper remedies.

TERETRUM, in Surgery. See Terebra.

TERFEZ, in Natural History, the name given by the
Africans to the truffles found in the deserts of Numidia,
and other places in that part of the world, in great
abundance.

These are much more delicately tasted than the European
truffles, and are white on the outside. They are called by
some of the Africans kema, and by the Arabian writers
cantha and canake.

TERFOWA, in Geography, a town of Africa, in the
kingdom of Tunis; 120 miles S. of Tunis.

TERFOWY, a town of Nubia; 150 miles S. of Syene.

TERGA, a town of Morocco, on the Morbeya; 90
miles N. of Morocco.

TERGA. See Hair.

TERGARRY, a town of Hindooftan, in Bednore; 14
miles S.E. of Simogou.

TERGAZA, in Ancient Geography, a town of Africa,
which was one of those which Manlius took possession
of in the third Punic war, and which he pillaged.

TERGESTE. See Trieste.

TERGESTICUS SINUS, a gulf of Italy, on the coast
of the Adriatic sea. It took its name from the town
Tergelle, which was situated there.

TERGIOETOUS PLANTS, such as bear their seeds on
the backides of their leaves: such are the capillaries. See
Capillary.

TERGIL, in Geography, a town of Afiatic Turkey, in
the province of Erzerum; 30 miles E. of Paln.

TERGIS, in Ancient Geography, a town of Africa, in
Libya, on the confines of Ethiopia.

TERGISONUS, a river of Italy, in Venetia, N. of the
river Padus.

TER-GOUD, or TER-GOUW, in Geography. See Goud.

TERGOVITZ, or Tergovista, a town and capital of
Walachia, where the waiwode has a palace; 64 miles S.E.
of Herisentadt. N. lat. 45° 3'. E. long. 25° 29'.

TERHALLEN, a small island near the coast of Terra
del Fuego. S. lat. 55° 20'.

TERHEY, a town of Holland; 10 miles W. of Delft.

TERIDATA, in Ancient Geography, a town of Afi, in
Medopotamia, on the banks of the Euphrates. Ptolemy.

TERINA, a town of Italy, upon the western coast of
Brutium, and in the northern part of the gulf Hipponium.—
Alto, a town of Asia, situated in the mountains W. of
Moxoune.

TERIUM, a town of Macedonia, in Pieria.

TERKAT, in Geography, a town of Afiatic Turkey, in
the government of Sivas; 20 miles N.W. of Toeet.

TERKELA, a river of Africa, which joins the Tafilet,
20 miles S. of Togda.

TERK. See Terek.

TERKI. See Turkin.

TERKIR, a lake of Thibet, about 80 miles long and
25 broad. N. lat. 32°. E. long. 91° 14'.

TERKUL, a river of Ruffia, which runs into the Ural,
at Uralss, in the government of Caucaus.

TERLIZZI, a town of Naples, in the province of Bar.
7 miles S.E. of Trani.

TERLON, a river of France, which runs into the
Sambre, about 3 miles below Landrecy.

TERM, TERMINUS, the extreme of any thing, or that
which bounds and limits its extent. See Extreme.

TERM, in Geometry, is sometimes used for a point, some-
times for a line, &c. A line is the term of a superficies,
and a superficies of a solid.

This is what the schools call terminus quantitatis.

TERM, in Law, signifies a boundary, or limitation of time,
or elapse.

In this sense we say, a leaf for term of life, for term of
years, &c.

TERMS, Termes, Terminus, in Architecture, denote a
kind of statues, or columns, adorned at top with the figure
of a man's, woman's, or satyr's head, as a capital; and
the lower part ending in a kind of sheath, or scabbard. See
Hermes.

Some write the word termes, from Hermes, a name the
Greeks gave the god Mercury; whose statue, made after
this manner, was placed in several of the crofs ways in the
city of Athens, &c. Others bring the etymology of
the word from the Roman god Terminus, the protector of land-
marks; whose statue (made without hands or feet, that he
might not change his place) was used to be planted at the
bounds of lands, to separate them.

Terms are sometimes used as confoles, and sultain en-
tablatures; and sometimes as statues, to adorn gardens.
Of these termi, the architects make great variety; viz. an- gelic.

TERMINUS, in Law, nominatus, among the ancient
Greeks, were the heads of certain divinities, placed on
square land-marks of stone, or on a kind of sheath, to mark
the several f3dia, &c. in the roads. These are what Plautus
calls larae viales.

They were usually dedicated to Mercury, whom the
Greeks believed to preside over the highways.

Some of them were reprezenated with four heads, such as
we ill see in Rome, at the end of the Fabricon bridge;
which is hence called ponte di quattro capi. It is known that
Mercury was thus reprezenated, and also called by the Latin
Mercurius quadrifrons: as being fupposed the first who in-
vented the use of letters, mufic, wrestling, and geometry.
See Hermes.

Terms are alfo used for the several times or feasons of
the year, in which the tribunals, or courts of judicature, are
open to all who think fit to complain of wrong, or to seek
their rights by due course of law, or action; and during
which the courts in Welfminter-hall fit and give judgment.
But the high court of parliament, the chancery, and inferior
courts, do not observe the terms; only the courts of king's
bench, common pleas, and exchequer, which are the highest
courts
courts at common law. In contradistinction to these, the
rest of the year is called vacation.

Of these terms there are four in every year, during which
time matters of justice are dispatched.

Hilary term, which, at London, begins the 23d of January,
or if that be Sunday, the next day after; and ends the
12th of February following.

Easter term, which begins the Wednesday fortnight after
Easter-day, and ends the Monday next after Ascension-day.

Trinity term, beginning the Friday next after Trinity-
Sunday, and ending the Wednesday fortnight after.

Michaelmas term, which begins the 6th of November,
and ends the 28th of November following.

Each of these terms has also their return; which fee.

These terms are supposed by Mr. Selden to have been
instituted by William the Conqueror; but Sir H. Spelman hath
shewn, that they were gradually formed from the canonical
constitutions of the church; being no other than those leisure
feasons of the year, which were not occupied by the great
feasals or fafts, or which were not liable to the general
avocations of rural busines. Throughout all Christendom,
in very early times, the whole year was one continued term
for hearing and deciding of causes. For the Christian
magistrates, in order to distinguish themselves from the Heathens,
who were very superflitious in the observance of their dies
fajli and nefajli, administered justice upon all days alike; till
at length the church interposed, and exempted certain holy
feasons from being profaned by the tumult of forensic litigations;
as, particularly, the time of Advent and Christmas,
which gave rise to the winter vacation; the time of Lent
and Easter, which created in the spring; the time of
Pentecost, which produced the third; and the long vacation,
between Midsummer and Michaelmas, which was allowed
for the hay-time and harvest. All Sundays also, and some
peculiar feasals, as the days of the Purification, Ascension,
&c. were included in the fame prohibition, which was esta-
blished by a canon of the church, A.D. 517, and fortified
by an imperial constitution of the younger Theodosius,
confirmed in the Theodosian code. Afterwards, when our own
legal constitution was established, the commencement and
duration of our law terms were appointed, with a view to
these canonical prohibitions; and it was ordered by the laws
of king Edward the Conferfator, that from Advent to the
octave of the Epiphany, from Septuagesima to the octave
of Easter, from the Ascension to the octave of Pentecost,
and from the in the afternoon of all Saturdays till Monday
morning, the peace of God and holy church shall be kept
throughout the whole kingdom.

And fo extravagant was afterwards the regard paid to
these holy times, that though the author of the Mirror
mentions only one vacation of considerable length, containing
the months of August and September, yet Britton fays, that
in the reigne of king Edward I. no secular plea could be held,
or any man sworn on the Evangelists, in the time of
Advent, Lent, Pentecost, harvest, and vintage, the days of
the great litanies, and all solemn feasals. He adds, that the
bishops and prelates granted dispensations for taking affizes
and juries in some of these holy feasons, upon reasonable
occasions; and soon after a general dispensation was esta-
blished in parliament by flat. 4 Edw. I. cap. 51,
that affizes of novel drugue, mort d'ancelle, and darrein pre-
sentment, should be taken in Advent, Septuagesima, and
Lent, as well as inquesas; at the special request of the king
to the bishop. The portions of time that were not included
within these prohibited feasons, fell naturally into a fourfold
division; and from some festival, or fain's day that imme-
diately preceded their commencement, were denominated the
terms of St. Hilary, of Easter, of the Holy Trinity, and of
St. Michael; which terms have been since regulated and
abbreviated by several acts of parliament; particularly
Trinity term by flat. 32 Hen. VIII. c. 2, and Michael-
mas term by flat. 16 Car. I. c. 6. and again by flat.
24 Geo. II. c. 58. Blackft. Com. vol. iii.

Terms, Oxford. Hilary or Lent term begins January
14th, and ends the Saturday before Palm-Sunday.
Easter term begins the tenth day after Easter, and ends the
Thursday before Whitunday. Trinity term begins the
Wednesday after Trinity-Sunday, and ends after the act,
or 6th of July, sooner or later, as the vice-chancellor and
convocation plege. Michaelmas term begins October 1oth,
and ends December 17th.

Terms, Cambridge. Lent term begins January 14th,
and ends the Friday before Palm-Sunday. Easter term begins
the Wednesday after Easter-week, and ends the week before
Whitunday. Trinity term begins the Wednesday after
Trinity-Sunday, and ends the Friday after the commence-
ment, or 2d of July. Michaelmas term begins October 1oth,
and ends December 17th.

Terms, Scaffolds. In Scotland, Candlemas term begins
January 23d, and ends February 12th. Whitsuntide term begins
May 25th, and ends June 15th. Lammas term begins
July 2oth, and ends August 8th. Martinmas term begins
November 3d, and ends November 29th.

Terms, Irif. In Ireland the termes are as at
London, except Michaelmas term, which begins October
13th, and adjourns to November 3d, and thence to the 6th.

Term, in Grammar, denotes some word or expression
in a language. See Word.

The word term, terminus, is borrowed metaphorically, by
the grammarians and philosophers, from the measurers or
surveyors of lands; as a field is defined and distinguished by
its termini, or limits, so is a thing or matter spoken of, by
the word or term by which it is denoted.

Term, in the Arts, or Term of Art, is a word which, be-
ides the literal and popular meaning which it has, or may
have, in common language, bears a farther and peculiar mean-
ing in some art or science. See Art.

Or, a term is a word which has one or more meanings
beside its grammatical one; or which has a peculiar force or
import in the language of some particular science or art.

A word then becomes a term when its idea is rendered
more complex, consists of more parts, and includes more
special circumstantial terms, on some occasions than others.

It is this greater complexity, this excess of constituent
parts of the idea, that denominates it a term in the general.

Farther, as the parts of the idea, signified by any word, are
arbitrary; and as one may not only add new parts to those
contained in the literal meaning, but also superadd others
to them, alter them, extend them, and otherwise modify
them at pleasure; hence the same word becomes a term of
this or that art, or both, as the inventors or improvers of
those arts have thought fit to adopt it for the common basis
of certain ideas, and to modify and circumstantiate its
meaning to the use of their respective arts. See De-
finite.

Terms, absolute, complex, concrete, equivalent, equivocal,
general, relative, synonymous, universal. See the adjectives.

Term, in Logic. A proposition is said to consist of two
terms, i.e., two principal and essential words, the subject
and the attribute.

A syllogism consists of three terms, the major, minor, and
conclusion. See SYLOGISM.

Terms of an Equation, in Algebra. See EQUATION.

Terms of Proportion, in Mathematics, are such numbers,
letters,
letters, or quantities, as are compared one with another. See Proposition.

Terms, or course, in Medicine, the menes, or women's monthly purgations.

TERMALLY, in Geography, a town of Hindoostan, in Mysoor; 15 miles N.E. of Anamtpour.

TERMED, or Termed, a town of Grand Burehia, at the union of two large rivers, whose united streams form the Jhon; the capital of a considerable district. In 1221, this town was besieged by Jenghis Khan, and, after eleven days, taken by assault; after which the conqueror put most of the inhabitants to the sword, and destroyed the town. It was rebuilt in the following century; 430 miles S. of Samarcand.

N. lat. 5° 30′. E. long. 65° 48′.

TERMEDH, or Kamili, a river of Asiatic Turkey, which runs into the Black sea, 30 miles N.E. of Samfoun.

TERMERA, or Termelnum, in Ancient Geography, a free town of Aifa Minor, in Caria.

TERMES, called Termes, a town of Hither Spain, belonging to the Arevaci, S. of Numantium.

TERNEs, in Entomology, a genus of the Aperta order of insects. Its characters are, that it has five legs formed for running; two eyes; and teftaceous antennae, and a mouth with two jaws. According to Gmelin, the characters are, that the mouth has two horns, with a horn, quadrifid lip, and two eyes. Linnæus enumerates three, and Gmelin eight.

Speciee.

Fatale. Above brown; thorax with three segments; wings pallid, and collar, or rib, teftaceous. This is the destructor of Degeer, and T. bellicosus of Smeathman. It is found in the shady parts of the equinoctial regions of India and Africa. See the sequel of this article.

DESTROCTON. Above teftaceous; head black; antennae yellow. Found in the islands opposite to South America, Africa, and India.

ARDA. Black; abdomen with segments white at the apex; legs pallid. Found in the equinoctial parts of Africa.

MORDAX. Black; the segments of the abdomen white at the apex; legs black. Found in the equinoctial parts of Africa.

CAPENSE. Yellow, with hyaline wings; brown at the margin. Found in India and Southern Africa.

FACTORUM. Abdomen ovate; mouth pallid; brown eyes; antennae teftaceous. Found in Europe, chieftly the southern part.

PULSATORUM. Abdomen oblong; mouth red; eyes yellow; antennae teftaceous. Found in Europe and America.

DIVINATORUM. Abdomen transversely fulcated; brown mouth, and black eyes. Chiefly found in books; very lively, irritable, and whitish.

It is observed, that the European species of termes are very small, compared with those of the warmer regions of Africa and America; and instead of being Gregarious, as in those climates, are usually found single. Of these, the most known is the T. pulsatiorum of Linnæus, a small insect of a whithell colour, and distinguished by Derham and some other naturalists, by the appellation of "Pediculus pulsatiorum." During the months of summer it is common in houes, particularly in decayed waincefts, and is remarkable for emitting a long-continued sound, refembling the ticking of a watch; it is commonly met with in collections of dried plants, &c. to which it is very injurious. It cannot bear, on account of its tender frame, the slightest pressure, and it is very quick in its motion. When magnified, the head appears large, the eyes very conspicuous, of a beautiful golden colour, and divided into innumerable hexagonal convexities; the antennae long and teftaceous; the palpi two in number, moderately long, and terminating in a large club-shaped top; the thorax rather narrow, and the abdomen obtusely oval; the thighs, or first joints of the legs, thick, the remaining ones slender, and the feet furnished with very small claws. The whole animal is beft with scattered hairs. This insect, according to the observations of Derham, when first hatched from the egg, is white, oval, and very small, exactly refembling a common mite; furnished with eight legs, and beft with long hairs. After a certain time it acquires its skin, and appears in the form already described. Degeer has found on each side of the thorax the appearances of rudiments of wings, refembling a pair of oblong scales; and Dr. Shaw affirms, from his own observations, that some individuals of this species become winged at their full growth; the wings, four in number, being very large, of a slightly indif fint appearance, and variegated with blackish and brown clouds or spots. In the beginning of July this change takes place, and several infestations may be seen with the wings half-grown; in a few days they gain their full size.

Dr. Derham is of opinion, that the ticking sound of these animals is analogous to the call of birds to their mates during the breeding season; and this opinion is very probable. This sound, says Dr. Shaw, as well as that produced by the "Pitius fatidicus," or death-watch, seems to prove in a convincing manner, that insects possess the faculty of hearing, though this be denied by some naturalists.

Of the exotic termes, the most remarkable is the T. bellicosus. The animals of this species have lately been minutely described by Mr. Smeathman, from whose account the following particulars are extracted.

The termes, which have been taken notice of by various travellers in different parts of the torrid zone, and called by the name of white ants, resembhe the ants in their manner of living, which is in communities, forming extraordinary nests in the surface of the ground, and various subterraneous passages, and also in their provident and diligent labour; but in both respects much surpass them. The termes are represented by Linnæus as the greatest calamity of both Indies, because of the havoc they make in all kinds of wooden buildings, utensils, and furniture, so that nothing but metal or stone can escape their destructive jaws.

Smeathman observes, that the insect in its perfect state has four wings without any fling, and should therefore be ranged under the neuroptera, and not under the aperta of the Linnæan system. The communities of termes confit of one male and one female, generally the parents of all the rest, and of three orders of insects, apparently of very different, though really of the same species. Those of the first order are the working insects, or labourers; the second comprehends the fighting insects, or folders, which do no labour; and the third are the winged ones, or perfect insects, which are male and female, and capable of propagation, but neither labour nor fight; the kings and queens belong to this order, and within a few weeks after they are elected and elevated to this rank, they migrate, and either establish new kingdoms, or perish within a day or two. The largest species, called termes bellicosus, is the best known on the coast of Africa; it creeps immense buildings of well-tempered earth or clay, which are constructed with signal ingenuity; it does infinite mischief in one respect, and in another it is peculiarly important and useful, by destroying those vegetable or animal substances which incumber the earth, and are noxious on account of their putridity. The buildings
TERMES.

buildings (usually termed hills) which these insects erect, are in their general form like sugar-loaves, and about ten or twelve feet high; and consist of an exterior part, which is large and strong, intended partly for defence, and partly for preserving a regular degree of warmth in order to hatch the eggs and cherish the young; and an interior, which is the habitable part, divided into many apartments for the residence of the king and queen, the nursing of their progeny, the accommodation of the foldiers and labourers, or magazines of provifion. The royal chamber, in the interior building, or that occupied by the king and queen, is situated near the centre, and usually in the shape of a semi-oval within.

In the infant state of the colony, it is not more than about an inch in length, but in time it is enlarged to fix or eight inches in the clear, being in size adapted to that of the queen. It has doors or entrances, at pretty equal distances from each other, which entrances are of a size not to admit any animal larger than the foldiers and labourers; so that the king and queen, when once immured, can never go out. The royal chamber is surrounded by many others of different sizes, shapes, and dimensions; and they either open into each other, or communicate by passages suitably contrived. These apartments are connected with the magazines, formed altogether of clay, and nurseries. The provisions lodged in the former appear by the microscope to consist principally of the gums or infusified juices of plants. The nurseries are composed entirely of wooden materials, joined together apparently with gums. These nurseries are occupied by the eggs, and young insects, which appear at first in the shape of labourers, but white as snow. They are very compact, and divided into small chambers, not one of which is to be found of half an inch in width. They are placed round and near the royal apartments. As the queen enlarges, her chamber is also enlarged; and new apartments are fitted up for her attendants; and also new nurseries at a remoter distance. Thus, says Mr. Smeathman, they continually enlarge their apartments, pull down, repair, and rebuild, according to their wants, with a degree of sagacity, regularity, and foresight, not even imitated by any other kind of animals or insects which he has ever heard of. These nurseries are always found slightly overlaid with or plentifully sprinkled with small white globules, about the size of a small pin's head, first supposed to be the eggs, but found by the microscope to be small mushrooms. The royal chamber is situated at about a level with the surface of the ground, at an equal distance from all the fides of the building, and in every direction surrounded by the apartments of labourers or foldiers, for the purpose of attendance. These apartments compose an intricate labyrinth, extending a foot or more in diameter, from the royal chamber on every side. Here the nurseries and magazines of provisions commence, and being separated by small empty chambers or galleries, are continued on all fides to the outward shell, and reaching up within it two-thirds or three-fourths of its height. All these chambers, and passages leading to and from them, being arched, help to support one another; and the exterior building supports them on the outside. Our limits will not allow our decribing all the subterranean galleries or passages, and the manner in which they are artfully made to communicate with different parts of the building, and to suit the convenience of the labourers and foldiers, as thoroughfares for passing and repassing with their loads of materials and provisions.

There are other nests or habitations contrived by other species, which are in the form of turrets, or upright cylinders, and contain a number of cells: they are of two sizes, for the accommodation of a larger and smaller species; and again another kind of nests, which is the habitation of a distinct species; this is generally spherical or oval, and built in trees.

Of the three orders above-mentioned, the labourers, which are about one-fourth of an inch long, and twenty-five of them weigh about a grain, are the most numerous; e. g. in the T. bellicosus, there seem to be at least one hundred labourers to one of the fighting insects or foldiers. The foldiers are about half an inch long, and equal in bulk to fifteen of the labourers; the mouth of the latter is evidently calculated for gnawing and holding of bodies, whereas that of the former, or foldiers, has its jaw shaped like two sharp awls, a little jagged, and as hard as a crab's claws, so that they are incapable of any thing but piercing or wounding: in insects of the third order, which have arrived at their perfect state, the head, thorax, and abdomen, are wholly different from those of the other orders, and they are furnished with four large brownish transparent wings; their length is six or seven-tenths of an inch, and each is equal in bulk to thirty labourers; they have now two eyes which are visible, whereas if they had them before they are not distinguishable. These insects are gathered and eat by the inhabitants, and reckoned both delicious and nourishing food. The king and queen are lodged in apartments, which are closed up, so that a passage remains merely for the ingests and egests of the labourers and foldiers, but at which (as we have already stated) neither of the royal pair can come out; and in the business of propagation the abdomen of the female extends to an enormous size, so that an old queen's will be fifteen hundred or two thousand times the bulk of the rest of her body, and twenty or thirty thousand times the bulk of a labourer, and by its peristaltic motion, are protruded eggs to the amount of sixty in a minute, or eighty thousand and more in twenty-four hours: the eggs are removed by the attendants into the nurseries, and after they are hatched, the young are provided with every thing necessary till they are able to shift for themselves. It is remarkable of all the different species of termites, that the working and fighting insects never expose themselves to the open air; but either travel under ground, or within such trees or subterranea as they destroy, or through pipes made of the same materials with their nests. The termites which build in trees, frequently contrive their nests within the roofs and other parts of houses, to which they do considerable damage, unless soon extirpated; and the larger species enter under the foundations of houses, through the floors, or bore through the poles of buildings, making lateral perforations and cavities, as they proceed. They are equally destructive when they get into a trunk containing clothes and other things, and into stores, &c.

Upon opening the hills in which the termites lodge, the behaviour of the foldiers excites admiration. When a breach is made, however quickly it be done, a foldier will run out, and walk about the breach, as if to see whether the enemy is gone, or to examine what is the cause of the attack. He will sometimes return again, as if to give the alarm; but in a short interval he is followed by two or three others, running as fast as they can, and these are followed by a large body, others also succeeding them, as long as any one continues to batter their building: nor is it easy to describe the rage and fury which they manifest on the occasion; biting every thing in their way, and making a vibrating noise, like the ticking of a watch, perceptible at the distance of three or four feet. If they get hold of any one who attacks their habitation, they will in an instant fick out blood enough to weigh against their whole body; and if they chance to wound the leg, the flux upon the focking will be seen to extend an inch
in width. They make their hooked jaws to meet at the first stroke, nor will they quit their hold, but suffer themselves to be pulled away leg by leg, and piece after piece, without the least attempt to escape. If, however, they are left to themselves undisturbed, they will in less than half an hour retire into the nest, as if they conceived their castle to be secure. Before they all get in, the labourers will be seen in motion, hastening to bring materials for repairing the breach. This they do without mutual obstruction, though their number be immense, and the work is soon finished. While the labourers are thus employed, the soldiers take no part with them. On a renewed attack, the labourers run with celerity into the numerous pipes and galleries with which the building is perforated; and the soldiers rush out as numerous and as vindictive as before. One circumstance more deserves to be mentioned; and that is the loyalty and fidelity displayed by the labourers and soldiers in their attendance on the royal chamber. This chamber is a large nest, is capacious enough to hold many hundreds of the attendants, besides the royal pair, and it is always found full. These faithful subjects never abandon their charge in the least diffusely, but rather die in their defence than desert them. If in an attack upon the hill, you stop short of the royal chamber, and cut down about half of the building, and leave open some thousands of galleries and chambers, they will all be shut up with their sheets of clay before the next morning. If even the whole is pulled down, and the different buildings are thrown together in a heap of confused ruins, provided the king and queen are not destroyed or taken away, every interference between the ruins, at which either cold or wet can possibly enter, will be so covered, as to exclude both; and if the insects are left undisturbed, in about a year they will raise the building to nearly its primitive size and grandeur.

There is another species, called the marching termites, which is much larger, and seems to be less frequent than the other. For an account of these, and many other curious particulars, we must refer to Philo. Tran. vol. lxxi. part i. art. 11. p. 139—192.

TERMIGNON, in Geography, a town of France, in the department of Mont Blanc, on the Arc; 12 miles E.N.E. of St. André.

TERMINALIA, in Antiquity, feasts celebrated by the Romans, in honour of the god Terminus.

Varro is of opinion, that this festival took its name from its being at the term or end of the year; but Fétius is of a different sentiment, and derives it from the name of the deity in whose honour it was held.

In reality, the Terminalia, or feasts of land-marks, were held in honour of Jupiter, considered in the capacity of conservator of land-marks or bounds. Dionyfus Halicarnassius tells us, that it was Numa Pomphilus who first consecrated land-marks to Jupiter; and adds, that the same prince appointed an anniverary day, on which the country-people, assembling together on the bounds of the lands, should offer sacrifices in honour of the tutelary gods thereof.

The Terminalia were held on the seventh, or, as Struvius will have it, on the tenth of the calends of March. No animal is to be sacrificed herein, it being deemed unlawful to flain the land-marks with blood: they only offered sacrifices of the first fruits of the earth; and in this the open air, and on the top where the land-marks were.

TERMINALIA, in Botany, from the terminal mode of growth and foliation in several of the species, the item being a striking example of what Linnaeus latterly called determinate ramifus, and the leaves being crowded at the ends of the branches, which are swelled in that part.—Linn. Mant. 21. Schreb. Gen. 728. Willd. Sp. Pl. v. 4. 967.

**TER**


Numerous flowers, above the others, and later, are entirely male.


1. T. Catappa. Broad downy-leaved Terminalia. Linn. Mant. 128. Willd. n. t. Ait. n. 1. Jacq. Coll. v. 1. 130. Lc. Rar. t. 197. (Adaramam; Rheede Hort. Malab. v. 4. 5. t. 3. 4.)—Leaves obovate, obtuse, very slightly toothed, delittu of glands at the base; finely downy beneath.—Native of the East Indies, in Java and in woods on the coast of Malabar, where the foil is fandy. Meffrs. Lee and Kennedy are faid to have introduced this tree into the English floves in 1778, but it has not yet bloomed, nor, considering its natural and lofty growth, is that event to be expected. The branches grow in a whorled manner; their extremities, clothed with roughy down, bearing each a close tuft of large broad leaves, a foot long, on short downy falks. Each leaf is tipped with a small point, and is abrupt or somewhat heart-shaped, though much contracted, at the base. Clifters numerous, axillary, ftalked, cylindrical, dens, many-flowered. Flowers greenish-yellow, half the fize of a currant-bloom, moft of them male. Fuit oval, compressed, larger than that of the alond-tree, reffifh, with a cylindrical kernel, which taffes like a filver, but is more tender and folicule. Its oil is faid never to turn rancid. The wood is hard and durable, and the tree is much planted about houfes, for the fake of its fiafe.

2. T. moluccana. Molucca Terminalia. Lamarec Dict. v. 1. 349. Willd. n. 2. Ait. n. 2. (T. glabra; Foril. Prodr. 74. Pl. Ecul. 52. Spreng. Antiq. Bot. 102. t. 2. Catappa; Rumph. Amboin. v. 1. 174. t. 68.)—Leaves obovate, obtuse, entire, delittu of glands at the base; smooth on both fides.—Native of the Molucca and Society ifles. Introduced into the English floves by the earl of Powis, in 1804. This is faid to be of a more humble fature than the foregoing, and the leaves are smaller, smooth at the back, though their footfalks are covered with denfe roughy down. The specific name of glabra (r) ought to have been retained in preference to moluccana. This is confidered as a facred tree in Otaheite, though ufed in building boats as well as houfes.

3. T. subcordata. Heart-leaved Terminalia. Willd. n. 3.—* Leaves obovate, obtute, somewhat wavy; smooth on both fides, heart-shaped at the base, without glands.*—Gathered by Humboldt and Bonpland, in South America. Willdenow, who had examined one of their dried fpecimens, fays * this species is very like the faf, but the bafe of the leaves is heart-shaped, and their margin very f slightly and unequally vaved; the footfalks somewhat downy. It differs from T. Catappa, in having the leaves somewhat wavy, very smooth
smooth on both sides, and heart-shaped at the base.” —This
leaf character seems to us to exist in T. Catappa.

4. T. laifolia. Broad wedge-leaved Terminalia. Swartz
Ind. Occ. 747. Willd. n. 4. (Arbor maxima, forte prun-
ifera, coriace cannabis, folio longissimo latifolium; Slenne Hist. v. 2. 130.)—Leaves ovate, obtuse, somewhat serrated, smooth on both sides, dehiscing by glands at the base: their midrib downy beneath.—Native of moun-
tainous woods in the north part of Jamaica. A tall, stout, unbranched tree, rising to the height of one hundred feet, or more, with horizontal branches, downy when young. Leaves crowded about the ends of the branches, on smooth stalks, thickish, markedly pointed, bluntly serrated, or nearly entire, tapering (not dilated or heart-shaped) at the base. Flowers small, whitish or yellowish, in long axillary clusters; the upper ones chiefly male. Fruit pulpy, greenish-red, sweet,
brightly colored, larger than a peach, eaten chiefly by hogs.
For kernel takes like an almond. The wood is valuable for its hardness. The inhabitants of Jamaica know this species
by the name of Broad-leaf Tree. Swartz.

falc. 5. 31. Willd. n. 5. Ait. n. 3. Roxb. Coromand.
v. 2. 52. t. 197. (Myrobolanus Chebula; Gartn. v. 2. 91.
t. 97.)—Leaves ovate-oblong, obtuse, entire, opposite, smooth on both sides; silky when young. Footstalks with two glands near the top. Leaves terminal. —Native of hills
in the East Indies. Retzius, who received his speci-
mens from Koenig, describes this tree as not more than three or
four times the height of a man, with no very widely
spreading top. Our specimens, from Dr. Rottler, agree
with every particular of his description. The young leaves
are beautifully silky. We find none of the marginal glands
represented by Roxburgh, nor are our leaves pointed, as
in his plate. The flowers in both are yellow, in terminal, often
aggregate, clusters. Dr. Roxburgh mentions the wood of the
tree he describes as hard and valuable, and the head as
evergreen, and widely spreading. The rind of its fruit
is much used by painters of chintz for drawing a permanent
outline, and by dyers to fix their colours. With falt of
feet it makes an excellent ink.

n. 6. —“Leaves oblong-elliptical, bluntly rounded, entire;
slightly hairy beneath, with two glands at the base.” —Native of
the East Indies. The branches are round, brown; downy when
young. Leaves two or three inches in length; con-
tacted at the base; very obtuse at the extremity, with a
slight point; dark green and smooth above; pale, and be-
sprinkled with close-pressed scattered hairs, beneath: furnished
at the base with two cup-shaped, somewhat rounded, glands.
Spikes terminal, panicled. Willdenow. We have been in-
clined to suspect this might not be distinct from the follow-
ing, but the inflorescence does not agree, nor could Willde-
now fully have omitted to notice the great length of the
foottalks in T. Bellerica.

7. T. Bellerica. Long-stalked Terminalia. Roxb. Co-
rom. v. 2. 54. t. 198. (Myrobolanus Bellerica; Breyne, Ic.
v. 18. t. 4. Gartn. v. 2. 90. t. 97. Tani; Rheede Hort.
Malsb. v. 2. 33. t. 10.)—Leaves ovate, wavy, smooth.
Footstalks about half as long as the leaves, with two glands
at the top. Spikes axillary, solitary, hardly longer than the
foottalks. —Native of hills in the East Indies. A large
tree, with a very widely spreading head; the wood is
white, but soft, and not durable. The bark, when wounded,
exudes a copious inflamed gum, like gum arabic, soluble in
water. The leaves are firm and smooth, six or seven inches
long when full-grown, but in the flowering season they seem
scarcely to exceed their footstalks, which then measure half
that length. Flowers fetid, dirty yellow, in copious axillary
spikes, not clusters. Fruit the size of a nutshell; its kernel
catable, but reported to intoxicat when taken in any great
quantity.

8. T. mauritiana. Mauritius Terminalia. Lamarck
Dict. v. 1. 349. Willd. n. 7. (Badamia Commerfonii;
Gartn. v. 2. 90. t. 97? Pamea guianensis; Aubl. Guian.
v. 2. 946. t. 349?)—Leaves lanceolate, slightly erect,
tapering at each end, smooth on both sides. Spikes
axillary, the length of the leaves. —Native of the isles
of Mauritius and Bourbon, and probably of Madagascar.
Commeron describes it as the largest and tallest tree of the
two former islands. He took it for a new genus, and named it
Refracta, under which name, and that of le faux benjoin, his
specimens are preferred in the Linnaean herbarium. The wood
is much esteemed for making canoes. The branches
are swollen at the ends, where they bear ample tufts of leaves
three or four inches long, on downy stalks, three-quarters of
an inch in length; when full-grown both appear, by La-
mark’s account, to be much larger. Flowers copious, in
simple axillary spikes. Fruit an inch in length and half long,
with a diluted compressed border, not altogether answering
to Gartner’s figure, which makes us doubt his synonym.
He has formed his barbarous generic name, Badamia, out of
the French Badamier, which is synonymous with Terminalia.
Aublet’s plate of his Pamea greatly resembles our plant, and
our chief doubt arises from their different places of growth.
That they are of the same genus cannot be disputed.

Hort. Vind. v. 3. 51. t. 100. Willd. n. 8. Ait. n. 4. (T.
Benzojin; Linn. Suppl. 424. Lamarck Dict. v. 1.
v. 4. 533.)—Leaves linear-lanceolate, wavy, downy on both
sides. —Native of the East Indies. Jacquin reports
that feeds of this species were sent him by Lemonnier, under
the French name of Bien-joint, from the Isle of Bourbon.
Hence he ingeniously and satisfactorily conjectures, that this
appellation, which alludes to the mode of growth of the
tree, may have been confounded with Benjoin or Benzoze,
the French word for gum Benjamin, or Benzoe, and thus
the said gum was supposed to come from the plant before
us. (See Styrax.) T. angustifolia has long been culti-
vated in our stoves, but the flowers are unknown. Its
manner of branching is like T. Catappa, mauritiana, &c.
but does it much differ from the last named, except that the
leaves are narrower, often quite linear, and clothed, more
or less completely, with brown, rather rigid, hairs.
Their veins, rib, and margin are tinged with a blood-colour.
The fruit appears to be similar to the last. Linnaeus raised
a plant from seed in the Uphal Rove, and remarked that the
feed-leaves were of a blood-red. The leaves of his specimen
hardly exceed a line in breadth.

v. 1. 350. Willd. n. 9. (Arbor vernici; Rumph. Am-
boin. v. 2. 259. t. 86.)—Leaves linear-lanceolate, entire,
smooth on both sides. —Native of the Molucca isles. It
is preumed to belong to this genus from the imperfect description
of Rumphius, and its evident resemblance to the two
last species. The leaves however are more disjunct, and of
larger dimensions, being from nine to eleven inches long, and
the breadth of three or four fingers, so that they are scarcely
to be termed linear-lanceolate. The rib is very prominent
beneath. Flowers yellow or whitish, with red stamens,
in drooping clusters or spikes. Fruit oblique and compressed,
two inches broad. The nut exudes a large quantity of resin,
soon turning brown, and a milky refrinous fluid is lodged
under the bark of the tree, at frilt of an acrid quality, but

3 A hardening
hardening into a valuable varnish, &c. The natives of the Moluccas. A noxious vapour is said to proceed from this tree, so that the natives of the countries where it grows avoid sleeping, or even sitting for any length of time, under its shade. Whether this be the most famous varnish-tree of the Chinese, as Rumphius indicates, may perhaps admit of doubt.

11. T. Tanibouca. Guarana Terminalia. (Tanibouca guaranensis; Aubl. Guan. 438. t. 178.)—Leaves scattered, obovate, pointed, entire, smooth. Clusters terminal and axillary. Native of marily places in Guarana. For an account of this species, see TANIBOUCA. Its genus must be very doubtful, unless the fruit was known, but the fugation of our learned friend Mr. Brown, Prodr. Nov. Holl. v. 1. 351, induces us, for the present at least, to refer the plant hither.

TERMINANDO et Audiendo. See AUDIENDO.

TERMINANS, Punctum. See PUNCTUM.

TERMINATION, Terminatio, in Grammar, the ending of a word, or the half syllable of it. They are the different terminations of one and the same words on different occasions, which constitute the different cases, numbers, tenses, modes, &c.

Termination, in Geography, an island in the South Pacific ocean, so named by captain Vancouver, as being the termination of his researches on the S.W. coast of New Holland, near which it lies. S. lat. 34° 32'. E. long. 122° 8'.

TERMINATOR, in Astronomy, a name sometimes given to the circle of illumination, from its property of terminating the boundaries of light and darkness.

TERMINE, in Commerce, a weight for gold, silver, and pearls at Tunis; 8 termeni being equal to an ounce; and 80 ounces of Tunis being equal to 81 ounces English Troy.

Termine, in Geography, a town of Naples, in Principato Ultra; 10 miles S.E. of Avellino.

TEMINER, in Law. See Over.

TERMINI, in Architecture. See Terms.

Termini, in Geography, a town of Sicily, in the valley of Mazara, situated on the north coast, celebrated for the warm baths near it, from which it received its name; 18 miles E. of Palermo. N. lat. 38° 5'. E. long. 13° 45'.—Algo, a river of Sicily, which runs into the Mediterranean, a little to the W. of Termini.

TERMINI. See Termon.

TERMINISTS, Terministi, in Ecclesiastical History, a sect or party among the Calvinists, whose particular tenets are reducible to five points: 1. That there are several perfons, both in and out of the church, to whom God has fixed a certain term before their death, after which he no longer wills their salvation, how long soever they live afterwards. 2. That God has fixed this fatal term of grace by a secret decree. 3. That this term once elapsed, he makes them no farther offer of repentance or salvation, but takes away from his word all the power it might have to convert them. 4. That Pharaoh, Saul, Judas, most of the Jews, and many of the Gentiles, were of this number. 5. That God still bears with several of this sort of people, and even confers benefits on them after the term is expired; but that he does not do it with any intention they should be converted.

All the other Protestants, and particularly the Lutherans, look on these articles with abhorrence, as repugnant to the goodness of God, and destructive to all Christian virtue; and as contrary to Scripture, particularly the following texts, Ezek. xviii. 33. 30, 31, 32; xxiii. 11. 1 Tim. iv.
the exterior on each side two inches longer than the other, and closed in flying, so as to appear one slender feather.

These birds frequent the sea-shores, banks of lakes, and rivers; they feed on small fish and water insects, hovering over the water, and suddenly darting into it to catch their prey. They breed among small tufts of rushes, and lay three or four eggs of a dull olive-colour, spotted with black. All the birds of this genus are very diligent. Passion.

Tern, Black, or Scree-crow. See Sterna furcata.

Tern, Surtain, or Darter. See Plotia surinamensis.

Tern, a word used by some authors to express an impetigo.

Terna, Folia, in Botany and Vegetable Physiography, are leaves, whether simple or compound, flexible or flaked, which grow three together in a whorl, on any flem or branch, as in Verbena triphylla, Curt. Mag. t. 367. Such a disposition of the foliage appears to prevail remarkably among the plants of Mexico, Chili, and Peru, of which, besides the example just named, many others may be found. (See the genera Fuchsia and Hemimeris.) Among British plants, Erica cinerea has natturally folia ternata; while the generally opposite leaves of Lysimachia vulgaris and Lythrum Salicaria occasionally become ternate. See Lea.

TERNALLA, in Geography, a town of Hindooftan, in Myloore, 145 miles E. of Rettingthe.

TERNARY MEASURE. See Measure.

TERNARY NUMBER, in Antiquity, was esteemed a symbol of perfection, and held in great veneration among the ancient mythologists. Whence Virgil,

—-"Numero Deus impare gaudeor." Ecl. viii. ver. 75.

Servius on this place remarks, that the Pythagoreans ascribed the ternary number to the Supreme God, as being the beginning, middle, and the end of all things. All the heathen gods had a three-fold power attributed to them, as the tria virgines ora Diana, the three-forked thunderbolt of Jupiter, the trident of Neptune, the three-headed dog of Pluto. Again, the Parcae were three, the Furies three, the Heroines was three nights in begettung, the Muses were ancienly three, the Graces three, etc.

This number was likewise used in most religious ceremonies, but especially in lubrications; whence Virgil, Aen. lib. xi. v. 188.

—"Ter circum accenfus, cineti fulentibus armis, Decurrere rogos."—

TERNATA, Folia, in Botany and Vegetable Physiography, are compound leaves, each of which consists of three leaflets, as in the Trefoil and Strawberry. These are called in English Ternate Leaves, and must not be confounded with Folia Ternata, see that article, for which last we have no appropriate term in our language. Some plants bear twice, or thrice, ternate leaves. See Leaf.

TERNATE, in Geography, an island in the East Indian sea, and the principal, though not the largest, among those called Moluccas or Spice Islands, of a circular form, and about 21 miles in circumference. In the centre is a lofty volcanic mountain, whose base extends almost to the sea every way. The upper parts are uncultivated, and covered over with shrubs and low trees; but in the plain are many gardens, and abundance of fruit-trees. On this mountain are found many hollows or caverns full of sulphur, which emit a thick smoke, and flame sometimes appears from the fummit, with a noise resembling thunder. The productions are cocoa-nuts, bananas, yams, oranges, and other fruits; but the principal article of commerce is cloves; many birds of paradise, and other beautiful birds, are found here, and plenty of game. The chief quadrupeds are goats, deer, and hogs. The boa serpent is sometimes found of the length of thirty feet. This island was first settled by the Spaniards, who were driven away by the Dutch, to whom the king of the island is, in some degree, subject. The Europeans have two forts, called "Orange" and "Terneke," between which is a lake, called "Safe," three miles in circumference, and 60 fathoms deep, separated from the sea by a narrow dike, which the Spaniards made a brutefiles attempt to cut-through, to form a port. On this island are three mosques, and a Dutch church, but no place of worship for the Portuguese. The province or government of Ternate includes the islands of Ternate, Tidore, Motir, Machian, and Bacian, which are what are properly the Moluccas; they are the original places of growth of the finer spices; and larger nutmegs are found in the woods of Ternate, than any other produced out of Banda. Some places, situated in the eastern part of the island of Celebes, belong likewise to this government; and the object of the Company in settling there is principally to furnish provisions for Ternate, that part of Celebes being very fruitful in rice and other necessaries. They also yield a considerable quanitity of gold, about 24,000 taels, of a dollar and a half in weight, yearly, amounting, at 5l. per tael, to 120,000l., and excellent bird's-nests, which are esteemed a great delicacy by the Orientals, and especially by the Chinese; in exchange for which the inhabitants take opium, Hindooftan pence-goods, chiefly blue cloth, fine Bengal coffees and hummums, together with some cutlery. Ternate does not, in general, require any supply of provisions from Java, as the isles of Bando do. This island suffered greatly in August 1776, by earthquakes. More than sixty violent shocks were felt in the fpace of twenty-four hours, and the fortifications were much injured. N. lat. 6° 37'. E. long. 127° 10'.

TERNATEA, in Botany, a genus so named by Tournefort, from Ternate, the native country of the plant. See Clitoria.

TERNAVASSO, in Geography, a town of France, in the department of the Po; 6 miles N.E. of Carmagnola.

TERNAY, Bay of, a bay or harbour on the E. coast of Chine, in Tartary, so called by M. Perouce in 1787, The Dutch navigators called it Port Acqui. N. lat. 45° 13'. E. long. 153° 29'.

TERNBERG, a mountain of Austria, near the river Enns; 6 miles S. of Steyr.

TERNEUSE, a town and fortresses of Flanders, situated on the W. branch of the Scheld, called the "Hondty," begun by the count of Hohenloe, lieutenant of the prince of Orange, in the year 1583, afterwards augmented by the States, for the fortifications have been since destroyed; 12 miles S.E. of Flushing.

TERNI, a town of the Pope, in the duchy of Spoleto, situated between two arms of the Nera, and, therefore, anciently called "Interamnum," or "Interamma." It is well built, and the site of a bishop, immediately subject to the pope. Its greatest trade consists in oil, besides which it also reaps considerable advantage from its excellent vineyards. This was the birth-place of the emperors Tacitus and Florianus, and of Tacitus the famous historian. Between S. and S.W., and the sea, the point of Terni, to the N.W., dead by the little town of Cesi, is Mount Eolo, remarkable for its cool breezes, which, especially in summer, blow from the cliffs and crevices in the rocks of this mountain; 14 miles S.S.W. of Spoleto. N. lat. 2° 34'. E. long. 12° 57'.
TERNIER, a town of France, in the department of the Leman; 5 miles S.S.W. of Geneva.

TERNOIS, Lr., a river of France, which runs into the Canche, near Hedon.

TERNSKAIA, a town of Russia, in the country of the Cossacks, on the Don; 156 miles E.N.E. of Azopol.

TERNOVA, a town of European Turkey, in Bulgaria. This town was anciently one of the strongest in the country, and the residence of the princes; at present it is thinly inhabited, and the fortifications are ruined. It is the residence of an ecclesiastical, who is called the archbishop of Bulgaria; 95 miles E. of Sophia. N. lat. 43°; E. long. 25° 24′. Also, a town of European Turkey, in Thessaly; large and commercial; on the Peneus; 5 miles W.N.W. of Larissa.


Gen. Ch. Cal. Perianth inferior, of one leaf, in five deep, orbicular, convexe, rather unequal segments, with two smaller ones closely applied to the base, all permanent and coriaceous. C.r. of one petal, bell-shaped, in five deep, orbicular, convexe, emarginate segments, longer than the calyx, without any tube. Stam. Filaments numerous, awl-shaped, shorter than the corolla, and inserted into its base in a double row; anthers linear, erect, the length of the filaments. Pét. German superior, roundish; Style cylindrical, as long as the stamens; Stigma capitata. Petio. Berry dry, ovate, smooth, of two cells. Seeds about eight, convex on one side, flat on the other.

Eff. Ch. Corolla bell-shaped; in five deep segments, without a tube. Calyx in five deep segments, with two smaller at the base. Berry dry, of two cells.

1. T. meridiana. Mexican Ternstroemia. Linn. Suppl. 264. Willd. n. 1.—Leaves obtuse, oblong, corrugate, entire. Flower-flanks axillary, compressed, recurved. Two outer segments of the calyx orbicular, sharply keeled.—Gathered by Mutis in Mexico and New Granada. A tree, determinately branched; the branches thick, rigid, leafy, nearly round, with a smooth grey bark. Leaves alternate, an inch or rather more in length, on short, thick, channelled, purplish footstalks, obviate, or nearly elliptical, peculiarly rigid and coriaceous, single-ribbed, smooth, with a thick somewhat revolute margin; their upper surface often dotted with either prominent or depressed points; the under purplish or rufly, especially when young. Stipulas none. Flower-flanks numerous, axillary, solitary, half the length of the leaves, very thick and rigid, two-edged, brown or purple, curved downwards, stipulate of pubescence, but, in the dried plant at least, wrinkled and uneven. Flowers larger than a hawthorn-blossom, white. The two smaller external scales of the calyx furnished with a sharp keel, ending in a minute point; the rest without any keel, thin and membranous at the edge; all smooth, orbicular, coriaceous, permanent. Corolla occasionally with six segments, at first globose, then bell-shaped. Berry dry, dehiscent of valves. Seeds filky, deep red. Such is the plant of Mutis. We have no means of ascertaining whether the West Indian one, described by Swartz in his Observations, be the same or not; but he says the flower-flanks are terminal, nor does he advert to their clumsy two-edged figure, so different from the rest of the species, that it could scarcely have escaped his notice.

2. T. elliptica. Elliptical Ternstroemia, or Rottenbanean. Swarth Ind. Occ. 929. Willd. n. 2. Vahl. Symb. v. 2. 61.—Leaves obviate, obtuse, entire. Flower-flanks lateral, elongated, nearly thread-shaped. Outer segments of the calyx ovate, acute, bluntly keeled.—Native of the West Indies, on the Sulphur mountains of Montserrat and Guadeloupe, as well as in St. Vincent's. It is said to be the pretended Jefuit's bark, mentioned by Labat. This is a fern with round, smooth, flat,消费升级 or clustered branches, leafy towards their extremities. Leaves like the leaf, but twice as long, and not emarginate; their footstalks longer and more flander. Flower-flanks an inch and half or two inches long, but slightly drooping or recurved, nearly round, not a quarter so blunt as the leaf, slightly swelling upward, red or purplish. Flowers rather larger than the foregoing, yellowish-white, some of them distitute of a ptil. The scales of the calyx are all pointed, the outer ones narrow and ovate, of a smaller proportion than in T. meridiana, and sometimes more than two.

3. T. japonica. Japan Ternstroemia. Thunb. Tr. of Linn. Soc. v. 2. 335. Willd. n. 4. (Cleyera japonica; Thunb. Jap. 224. Mokoki; Kämpf. Am. Exot. 873. t. 774.)—Leaves obviate-lanceolate, obtuse, nearly entire. Flower-flanks lateral, somewhat angular. Outer segments of the calyx triangular, pointed, lightly keeled.—Gathered by Thunberg, near Nagafuki in Japan, flowering in autumn. This is a tree, smooth in every part. Specimens sent us by the finder are so very nearly akin to the foregoing species, that it is hard to establish a specific difference between them. The leaves of the Japan plant however are rather more lanceolate, and their margin is sometimes, not confluent, recreate towards the point. Their surface is quite smooth, not vividly dotted. The flower-flanks, about an inch long, are scattered on the branches, below the leaves, but lightly recurved, usually triangular, not compremised. Flowers white, scarcely so large as in T. meridiana. Style short and thick. Berry the size of a currant, red, pointed, with a white, sweet, subflavorient pulp, and, according to Kämpf, only one pellucid seed.

4. T. punctata. Dotted-edged Ternstroemia. Swarth Prodr. 81. Willd. n. 3. (Taonabo punctata; Aubl. Guian. 571. t. 228.)—Leaves elliptic-oblong, dotted at the edge. Flower-flanks axillary, elongated, nearly thread-shaped. Segments of the calyx all pointed.—Gathered by Aublet on the sides of the Serpent mountain in Guiana, bearing flowers and fruit in August and September. A large tree, whose leaves are bordered with minute glandular points, rough to the touch; their extremity usually emarginate; their length about three inches. Flower-flanks slender, about half as long as the leaf with its footstalk. Stamen about fifty. Fruit ovate, pointed, of five or six cells. Aublet having seen it in an unripe flatly only, too, for a capillace, but Swartz ascerts it to be a berry.

5. T. dentata. Toothed Ternstroemia. Swarth Prodr. 81. Willd. n. 5. (Taonabo dentata; Aubl. Guian. 569. t. 227.)—Leaves elliptic, pointed, strongly serrated. Flower-flanks lateral or axillary, single-flowered. Gathered by Aublet, in the same place as the preceding, and at the same scale. A tree, whole trunk is twenty-five feet, or more, in
in height, and two in diameter, crowned with an ample tuft of spreading branches. The leaves are four inches long, and an inch and half or two inches broad, thick, smooth, tapering at each end, befit with tooth-like serratures in the margin. Footstalks slender, an inch long. Flower-stalks recurved, feattered, hardly an inch in length. Flowers yellow, the size of hawthorn. Fruit like the leaf. The bark of the tree is used for tanning leather. The wood serves instead of tiles for houses.

6. T? corystofa. Corystofe Ternstroemia?—Leaves opposite, elliptical, pointed, entire. Panicle forked, corystobol, many-flowered, terminal.—Native of Guiana. Mr. Rudge. This appears to be most akin to the lath in the shape and size of its leaves, but differs in their entire margin, and opposite insertion. The three-forked panicle is, moreover, a kind of inflorescence unexampled in Ternstroemia, and the calyx wants the two small external segments. All these circumstances induce a suspicion of the genus, which we have not materials to clear up.

We cannot take leave of Ternstroemia without adverting to the microse which arise from the barbarous and unsettled principles of French nomenclature. Jullieu professes to adopt the unmeaning names of Aulot, only till the genera of that author are better settled; yet he has tried to soften down Ternstroemia into Ternabea, a needlecell change if the name were not to remain. Lamarck prefers Ternabea; for our memories and our indexes would have become burthened with three names instead of one, all intolerable to a chaffical or literary boxtail, if the genus had not happily been superfeated. TEROE, in Geography, a town of Bengal; 25 miles E. of Ramgur.

TEROUANNE. See Therouanne.

TEROWA, a town of the island of Junkielon, near the est coast; the usual residence of a Siamese governor or viceroy. Here is a pagoda, with about twenty priests. N. lat. 8° 13'.

TERPANDER, in Biography, and Music of the Ancients, one of the most renowned musicians of antiquity. It is recorded in the Oxford Marbles, that he was the inventor of characters to express musical sounds in the several genera; which event is placed about six hundred and seventy years before the Christian era. Indeed all writers who mention the progressive flate of music in Greece, are unanimous in celebrating the talents of Terpander; but though there is such an entire agreement among them concerning the obligations which the art was under to this musician in its infant state, yet it is difficult to find any two accounts of him which accord in adjudging the time and place of his birth. It does not, however, feem necesseary to lead the reader over hedge and ditch with chronologers, after a truth, of which the seint has fo long been lost. The Oxford Marbles, which appear to us the best authority to foliow, tell us, in express terms, that he was the son of Dercus of Lesbos, and that he flourished in the 381st year of these records; which nearly answers to the 27th olympiad, and 671st year B.C. The Marbles inform us likewise, that "he taught the names, or airs, of the lyre and flute, which he performed himself upon this last instrument, in concert with other players on the flute." Several writers tell us that he added three flings to the lyre, which before his time had but four; and in confirmation of this, Euchid and Strabo quote two verses, which they attribute to Terpander himself.

"The tetrachord's restraint we now despise, The seven-flringed lyre a nobler strain supplies."

If the hymn to Mercury, which is ascribed to Homer, and in which the seven-flringed lyre is mentioned, be genuine, it robs Terpander of this glory. The learned, however, have great doubts concerning its authenticity. But if the lyre had been before his time furnished with seven flings in other parts of Greece, it seems as if Terpander was the first who played upon them at Lacedaemon. The Marbles tell us that the people were offended by his innovations. The Spartan discipline had deprived them of all their natural feelings; they were rendered machines; and whether Terpander disturbed the springs by which they used to be governed, or tried to work upon them by new ones, there was an equal chance of giving offence. The new flings, or new melodies, and new rhythm, upon the old flings, must have been as intolerable to a Lacedaemon audience, at first hearing, as an organ, and cheerful music would have been, to a Scots congregation some years ago, or would be at a Quaker's meeting now. "It is not at all surprising," says Alciates, "that the Lacedaemonians fear nothing of death in the day of battle, since death would free them from those laws which make them fo wretched."

Plutarch, in his "Laconic Institutions," informs us, that Terpander was fixed by the ephori for his innovations. However, in his "Dialogue on Music," he likewise tells us, that the same musician appeared a sedition at Sparta, among the fame people, by the persuasive strains which he sang and played to them on that occasion. There seems no other way of reconciling these two accounts, than by supposing that he had, by degrees, refined the public taste, or depraved his own to the level of his hearers.

Among the many signal services which Terpander is said to have done to music, none was of more importance than the notation that is ascribed to him for ascertaining and preferring melody, which was before traditional, and wholly dependent on memory. The invention, however, of musical characters has been attributed by Alypius and Gaudentius, two Greek writers on music, and, upon their authority, by Boethius, to Pythagoras, who flourished full two centuries after Terpander. It will be necessary therefore to tell the reader upon what grounds this useful discovery has been bellowed upon him.

Plutarch, from Heraclides of Pontus, affirms us that Terpander, the inventor of names for the cithara, in hexameter verse, "let them to music," as well as the verses of Homer, in order to sing them at the public games. And Clemens Alexandrinus, in telling us that this musician wrote the laws of Lycurgus in verse, and "let them to music," makes use of the same expression as Plutarch, which seems clearly to imply a written melody. See Musical Game.

TERPELING, in Geography, a town of Thibet; 8 miles S.W. of Panom Jung.

TERPENTARIA, in Botany, a name used by some authors for the betonica aquaticia, or great water-ligwort, called water-leyton.

TERPIIUS, in Ancient Geography, a town of Macedon, in Mygdon. Prolemy.

TERPONUS, a town of Illyria, belonging to the Jadoces, of which Cesar took possession, according to Appian.

TERPSICHORE, the Jovial, as her name imports, in Mythology, the name of one of the nine Muses, (which see.) This muse is represented on medals and other monuments, by the flutes which she holds in her hands.

TERRA, in Geography.

TERRA, in Chemistry.

TERRA, in Natural History. See Earth.
Terra Alana, a name given to the yellowish-white tripoli.
Terra Adanica, a name given to the alkaline red mould.
See Adamic Earth.
Terra Armenia. See Bole.
Terra de Baira, the name given by some to an earth of a white colour, found about Baira, near Palermo.
It is esteemed a very great medicine in the cure of malignant fevers, and in the stopping of hemorrhages of all kinds. The powder of it is commonly sold in Italy under the name of Claromont-powder; a name it obtained from a person who first found out its virtues, and communicated them to the world in a treatise expressly written on the subject. Boccone, Muf. de Filic.
Terra Cariosa. See Tripoli.
Terra, Chlo, in the Materia Medica of the Ancients, an earth of the marle kind, found in the island of Chlo, and given internally as an astringent; but its chief use among them was as a cosmetic, the ladies esteeming it the finest of all things for clearing the skin, and smoothing wrinkles. What title it has to these qualities the world has not of late ages inquired into; but the substance is still in being, and to be had in any quantities from the same place. And the descriptions Dioscorides and Galen have left us of it are so accurate, that there is not the least room to doubt but that the earth now found there, was the very kind they used. It is a dense compacted earth, yet very soft, and of a texture easily disintegrated and broken by water.
Terra Cicilia. See Cicilia.
Terra Cinelba. See Cimolite.
Terra Cinolia Purpurea. See Soap-Earth.
Terra Colonies. See Cologne-Earth.
Terra Donnata. See Caput Mortuum.
Terra Folata Tartari, foliated earth of tartar, is a name improperly given to a neutral aceto-salt, with a basis of fixed vegetable alkali; or to a combination of the acid of vinegar, faturated with the alkali of tartar, or of other vegetable matter. This salt has also been called regenerated tartar, because the alkali of tartar is united with an acid, which is in some respects similar to the acid of tartar, but is in others very different.
The terra folata is made by pouring upon a quantity of alkaline salt of tartar, in a glass eurnbit, a sufficient quantity of good distilled vinegar, at different times, to faturate all the alkali, or even a little more than is necessary for that purpose, till the effervescence entirely ceases. This faturated liquor is to be filtrated and evaporated to dryness, with a gentle heat. The dry salt thus obtained is to be disolved in spirit of wine, and the solution again evaporated to dryness; by which means a salt is obtained more or less white, of a silky appearance, and composed of small scales or leaves, whence it has been called folata. When the salt is dried, and while it is hot, it must be shut up in a well-closed bottle, because it quickly becomes moist by exposure to air.
When distilled vinegar is poured upon salt of tartar, little or no effervescence is made at first, because a part of the alkaline salt employed is generally caustic, or deprived of its gas, which part unites with the acid preferably to the mild part of the alkali, and absorbs any gas that is extricated from the latter part; and, therefore, till all the caustic part of the alkali be nearly faturated, little or no effervescence can happen. But when more vinegar is added, the effervescence becomes so considerable, that some of the liquor will, without care, flow over the vessel. This effervescence is occasioned by a large quantity of air that is disengaged during the faturation. When the faturation is advanced to a certain degree, the effervescence diminishes; but the combination of the salt portions of the acid and alkali may be facilitated by frequently agitating the liquor, which will renew the effervescence. The tafe of the foliated earth is sharp, pungent, a little caustic, and partaking at the same time of the tafe of vinegar and that of fixed alkali. It is soluble in spirit of wine, and may be decomposed merely by the action of fire, and from it may be obtained by distillation, a very penetrating and concentrated radical vinegar. It is little used except in medicine. Macquer's Chem. DiG.
Preparations of this kind are given in doses of ten or twenty grains as mild aperients, and to a drachm or two as purgatives and diuretics. Lewis.
Terra Golbergensis. See Golbergensis Terra.
Terra Japanica. See Japan Earth, and Catechu.
Terra Lemnia. See Lemnian Earth.
Terra Lignicensis. See Lignicensis Terra.
Terra Livonica. See Livonica Terra.
Terra Melia. See Melia Terra.
Terra Melitensis. See Melitensis Terra.
Terra Merita, in the Materia Medica, a name given by some authors to the curcumina, or turmeric-root.
It is from a false pronunciation of this name, terri merit, that the English turmeric has its origin.
Terra Mysella. See Thraustomatiches.
Terra Noceriana. See Noceriana.
Terra Samia. See Samia Terra.
Terra Selensuica. See Selenusiaca.
Terra Sigillata. See Sigillata.
Terra Sigillata Magni Ducis. See Etrusca Terra.
Terra Sigillata Fusca, a bole of a beautiful brown colour, found in Germany, England, and America.
It is of a dense texture, makes no fermentation with the strongest acids, and if thrown into water, it soon separates into a number of thin flakes.
The Germans give it in fluxes and malignant fevers, being an excellent astringent, and worthy to be introduced into our shops.
Terra Silesiana, Silesian Earth, a fine astringent bole, called by some authors axungia folis.
It is very heavy, of a firm compact texture, and in colour of a brownish-yellow. It breaks easily between the fingers, and does not stain the hands, is naturally of a smooth surface, and is readily dissolvable in water, and melts freely into a butter-like substance in the mouth; it leaves no grittiness between the teeth, and does not ferment with acid menstrua. These are the characters by which it is known from all other earths of a like colour; it is found in the perpendicular fissures of rocks near the gold-mines at Strigonium, in Hungary, and is supposed to be impregnated with the sulphur of that metal. It is, however that be, a good astringent, and better than most of the boles in use. Hill.
The terra Silesiana is also called terra sigillata Strigonensis.
Terra Sinopica. See Sinopica Terra.
Terra Solis, a name given by the German naturalists to a kind of black fungy earth, somewhat approaching to the nature of that English black earth which we call kellow, but containing gold. It is not properly an ore of gold, but is an earth into which some small particles of gold have been washed from some other place, and there detained. A good microscope will discover these particles in the richer pieces of the earth, and they are bright and pure, though very small: the earth is found in fissures of the other strata, not in any beds or strata of itself. It is not to be had in any great quantity, nor does it contain any large portion of gold.
Terra Strigonensis. See Strigonensis Terra.
**Terra Turcica.** See Turcica Terra.

**Terra Virginie Aurea,** in Natural History, the name of a medicinal earth, mentioned by Boccone.

It is found at a place called San Peo, in the state of Modena; and is thence sent to Venice, and many other places, where it is esteemed a very famous medicine.

Its great use is in hemorrhages of all kinds; but it is also given with success in malignant fevers. Boccone, Muf. de Ficis.

**Terra Viridis.** See Terre Verte.

**Terra Umbria.** See Umbria.

**Terra Zozica,** a name given to the alkaline red mould, called also Adamic earth.

**Terra Petra, in Law.** See Summons.

**Terra,** in our Ancient Law-Books, occurs in the sense of land, or ground, joined with divers additions; as, Terra Normannorum, the lands of such Norman noblemen as were forfeited to the crown, by the owners taking part with the French king against Henry III. Terra frustra, such land as had not been lately ploughed. Terra gilflora, land held by the tenure of paying a glifflower yearly. Terra vexitra, land fown with corn, and the crop still remaining thereon. Terra feuflenta, land held free from feudal services, and devote by will. Terra culta, land that is tilled and manured, in contradiftinction to terra inculta. Terra affirma, land let out to farm. Terra dominica, or indominica, demefne land of a manor. Terra hydata, land that may be gained from the sea, or enclosed out of a waste or common to particular ufe. Terra waflabilis, tillage-land. Terra suaretra, fallow-land. Terra bocalis, wood-land, &c.

**Terra Extendens, is a writ directed to the escheator, &c. ordering him to inquire and find out the true yearly value of any land, &c. by the oath of twelve men, and certify the extent in chancery.

**Terra or Tierra Australis del Espiritu Santo,** in Geography, an island in the South Pacific ocean, and the moft wefterly as well as the largeft of thofe called New Hebrides: discovered by Quiros, and visited by captain Cook in the year 1774; 22 leagues long, 60 miles in circuit, and 12 in breadth. The land of it, especially the well fide, is exceedingly high and mountainous: and in many places the hills rife directly from the sea. Except the cliffs and beaches, every other part is covered with wood, or laid out in plantations. Besides the bays of St. Philip and St. Jago, the ifles which lie along the fouth and eaftrift coast cannot, in the opinion of captain Cook, fail of forming fome good bays or harbours. S. lat. 14° 40' to 15° 40'. E. long. 166° 45' to 167° 32'.

**Terra Firma** is fometimes used for a continent, in contradiftinction to iflands.

Thus Afa, the Indies, and South America, are uffually diftinguifhed into terra firras and iflands.

**Terra Firma,** in a more restrifled fense, denotes an immense extent of country under the authority and government, direct or indirect, of the crown of Spain, comprehending several extenfive provinces, and three audiences, fixed at Panama, Quito, and Santa Fe de Bogota: the large provinces are Terra Firma Proper, Popayan, Quito, and New Granada, all of which are again subdivided into fome smaller provinces or jurifdictions.

**Terra Firma, or Tierra Firma, in a still more confined fense, comprifes three districts in the viceroyalty of New Granada, viz. Darien, Panama or Tierra Firma Proper, and Veragua.

**Terra Firma, or Tierra Firma, Proper.** See Panama.

**Terra del Fuego, a large island, feparated from the southern extremity of America by a narrow fea, called the "Strait of Magellan."** So named from the volcanoes obferved on it. Capt. Cook was the firft navigator who had the honour, from a series of the moft fatisfactory obfervations, beginning at the W. entrance of the Straits of Magellan, and carried on with unwearied diligence round this ifland, through the ftrait of Le Maire, to conftruct a chart of the southern extremity of America. The fouth-west coast of Terra del Fuego, fays this diftinguifhed navigator (Second Voyage, vol. ii. p. 199, &c.) "with refpect to inlets, iflands, &c. may be compared to the coast of Norway; for I doubt if there be an extent of three leagues where there is not an inlet or harbour, which will receive and shelter the largest fhipping. The work is, that till these inlets are better known, one has, as it were, to fill for anchorage. There are feveral lurking rocks on the coast; but happily none of them lie far from land, the approach to which may be known by founding, fupposing the weather fo obftinate that you cannot fee it. For to judge of the whole by the parts we have founded, it is more than probable that there are ftoundings all along the coast, and for feveral leagues out to fea. Upon the whole, it is by no means the dangerous coast it has been represented. The currents between Cape Defendada and Cape Horn fett from west to eait, that is, in the fame direftion as the coast; but they are by no means confiderable. To the eait of the cape, their fame is much increafed, and their direftion is north-eait to Staten Land. They are rapid in Straits Le Maire, and along the fouth coast of Staten Land, and let like a torrent round Cape St. John, where they take a north-west direftion, and continue to run very frong both within and without New Year's Ifles. While we lay at anchor within this ifland, I obferved that the current was ftronger during the flood; and that on the ebb its fame was fo much impaired, that the fhip would fometimes ride head to wind, when it was at weft and west-north-west. This is only to be undeerstood of the place where the fhip lay at anchor; for at the very time we had a frong current fett to the weftward, Mr. Gilbert found one of equal fame near the fouth coast of Staten Land fettling to the eaitward; though probably this was an eddy current or tide."

Most writers who have mentioned the ifland of Terra del Fuego, defcribe it as deftritute of wood, and covered with snow. The latter circumstance may occur (see Hawkesworth's Voyages of Cook, &c. vol. ii.) in winter. And by thofe who faw it at that fea, it might be conceived to be without wood. Lord Anfola was there in the beginning of March, anfwering to our September; but Capt. Cook was there in the beginning of January, correfting to our July; and thus we may account for their different statements. We fell in with it, fays Cook, about 21 leagues W. of the ftrait of Le Maire, and trees were visible with glaffes; and though upon approaching it patches of snow were discoverable, yet the fides of the hills and the faa-coaft appeared to be covered with a beautiful verdure. The hills are lofty, but not mountainous, though their summits are quite naked. The foil in the valleys is rich, and of a confiderable depth; and at the foot of almost every hill there is a brook, the water of which has a reddith hue, but it is not ill-tafted. The moft remarkable land in Terra del Fuego is a hill, in the form of a fugar-loaf, which fands on the W. fide, not far from the faa; and the three hills, called the "Three Brothers," about nine miles W. of Cape St. Diego, the low point that forms the entrance of the ftrait of Le Maire. (See Le Maire.)
his second voyage. Capt. Cook, desirous of coasting the S. side of Terra de Fuego, round Cape Horn, to the Strait of Le Maire, reached the W. coast of the island Dec. 17, 1774, and having continued to range it till the 20th, came to an anchor in a place which he called "Christmas Sound." Through the whole course of his navigations, he had never felt to defolate a coast. It seems to be entirely composed of rocky mountains, without the least appearance of vegetation. These mountains terminate in horrible precipices, the craggy summits of which rise up to a vail height; so that scarcely anything can in appear with a more barren and savage aspect than the whole of the country. But barren and dreary as the land is about Christmas Sound, it was not wholly destitute of accommodations. Near every harbour our navigator found fresh water, and wood for fuel. The country abounds likewise with wild fowl, and particularly with geese, which, with their Madeira wine, enabled them to keep a cheerful Christmas. The inhabitants of Terra del Fuego were found by Cap. Cook to be of the same nation which he had formerly seen in Success Bay, and the same with those denominated by M. de Bougainville "Pechars." They are a little, ugly, half-starved, beaked race, and go almost naked; but it is their own fault that they are not better clad, as nature has furnished them with ample materials for that purpose. By fixing their felkin cloaks with the skins and feathers of aquatic birds, by making the cloaks themselves larger, and by applying the same materials to different parts of clothing, they might render their dress much more warm and comfortable. But while they are doomed to exist in one of the most inhospitable climates on the globe, they have not sagacity enough to avail themselves of those means of adding to the conveniences of life, which Providence has put into their power. The captain, after having witnessed many varieties of the human race, pronounces the Pechars to be the most wretched. Those on the S. are said to be uncivilized, treacherous, and barbarous; while those on the opposite side are represented as simple, affable, and perfectly harmless. The tents which they inhabit are made of poles, disposed in a conical form, covered with skins, or the bark of large trees. The country, though barren, abounds with a variety of unknown plants, for exciting the curiosity of the botanist. The extent of Terra del Fuego, and consequently of the Straits of Magellan, was ascertained by Cook to be less than had been laid down by the generality of navigators; nor was the coast, upon the whole, found to be so dangerous as it has been represented; the winter was also remarkably temperate. The fia-lions and fia-bears, the fhangs and penguins on the coast, are abundant, and intermix, like domestic cattle and poultry in a farm-yard, without attempting to molest one another. Eagles and vultures were seen on the hills among the fhangs in perfect tranquillity. Sir Joseph Banks, Dr. Solander, and some others, landed here in the month of January 1769, which is the time of summer in that part of the globe, notwithstanding which, two of the company fell a sacrifice only by sleeping one night, and Dr. Solander himself barely escaped. S. lat. 52° 50' to 55° 35'. W. long. 50° 20' to 58°.

TERRE MAGELLANICA. See PATAGONIA.

TERRE NIAGA, a bay in Hudson's Bay. N. lat. 62° 4'. W. long. 67°.

TERRE DOS FAMOS, a tract of country on the S.E. of Africa, N. of Natal.

TERRE NOVA, a sea-port town of Sicily, in the valley of Noto, situated in a gulf or bay of the Mediterranean, founded about the middle of the 13th century, by the em-
broad for a grass or gravel walk of proportionable width; designed in gardens as a high, airy walk, to command a better prospect of the adjacent places around, within and without the garden occasionally, as well as to enjoy the fresh air in summer more freely. In the former style of laying out gardens, it was considered as very ornamental, but is at present much in disuse.

It may be remarked, that the height of a terrace-walk may be more or less, as the situation admits, as from one foot to one or two yards, or even three or four yards or more in particular situations; and where there is plenty of earthy materials, rubbish, &c. to form it, allowing breadth in proportion, from five to ten or twenty feet or more, and extended to any length required. They are sometimes formed on some naturally high rising ground, to save as much trouble as possible in bringing stuff from a distance; and sometimes raised wholly of forced materials. But the situation for a terrace may be varied as the natural situation of the place may require.

In respect to form, they should always be broader at the base than the top, and extend lengthways to any distance required; having the sides regularly sloped, of more or less acclivity, as the width, height, and situation require. Sometimes both sides are sloped, and sometimes only one side, the other perpendicular, and faced with a subfintal wall, &c. or formed against the side of a hill, or some naturally rising ground, being finished always broad enough at top to admit of a proper walk. In some naturally elevated situations, terraces are sometimes formed one above another, in two or more ranges, each having its separate side slopes, and elevated walk; in all of which the slopes are to be neatly laid with grass, and the walk at top occasionally of grass or gravel.

The entrances leading to terrace-walks were formerly sometimes formed by an easy acclivity of a gravel or gravelled slope, and sometimes by a grand flight of stone steps. Where a rising ground of considerable elevation naturally presents itself in a proper situation, it is an eligible opportunity for forming a terrace with the least expense and trouble, on account of its not requiring the addition of so much earth and rubbish, as when raised entirely on a perfect level, wholly of made ground. Where there are any excavations of ground intended to form ha-has, pieces of water, &c. the excavated earth may be employed in forming terraces, &c.

In the bulwarks of forming a terrace, the base must be flanked out wider than the intended width at top for the walk, in order to admit of the ascent of slopes being moderate. And the whole of the made earth and rubbish must be well rammed and rolled down from time to time as it is applied, in order to render the whole equally firm, that it may not settle irregularly after being finished. The slopes may either be laid with turf, or town with grass-feeds; but the first is much the best method, where it can be employed. See Grass Ground.

Terraces are now but little attended to, and, of course, but seldom employed in modern ornamental gardens, as they are mostly considered as having a too stiff and formal appearance, and as not constituting that sort of neatness and tasteful elegance, which is so much esteemed and admired at present in all sorts of works of the garden kind.

Terrace, Counter, is a terrace raised over another to join two grounds, or raise a parterre.

Terrace is also applied to the roofs of houses that are flat, and on which one may walk; as also to balconies that project.

The terrace is properly the covering of a building which

Vol. XXXV.
attention by the mere tone of his voice, and who required only a camera, or outline, to colour at his pleasure, is in less want of artificial and captivating composition, than an ordinary finger, who is neither possessed of voice nor taste sufficient to interest the audience. And Terradellas seems to have written all his songs for performers of abilities; for his airs are never made easy and trivial in order to spare the finger. Jomelli's pen always flowed with this spirit: for he never rejected a passage that presented itself, because it would be difficult and troublesome in the execution; but this freedom of style, twenty years ago, might be more safely practised than at present: for it is well known, that a company of fingers is now reckoned good, in Italy, if the two first performers are excellent; and an opera is sure to please if two or three airs and a duet deliver attention; the audience neither expecting nor attending to any thing else. And the managers, who find this custom very convenient, take care not to interrupt play or conversation by the useless and impertinent talents of the under-fingers; so that performers of the second or third class are generally below mediocrity.

He died at Rome in 1751, of grief and mortification, for the failure of an opera which he had composed with more care and hopes of success than usual. TERRASSON, in Geography, a town of France, in the department of the Hérô; 13 miles N.N.E. of Grenoble.

TERRASSON, John, Abbe, in Biography, a man of letters, was born at Lyons in 1770, and lent by his father, who was a very religious man, to the house of the Oratory in Paris; but the fon, quitting this congregation, and disappoiting his father’s views, incurred his resentment, so that he was left with a very moderate pittance. However, the abbé Bigonn procured him admission into the Academy of Sciences in 1707: he soon became a member; and in 1721, professor of Greek and Latin in the Royal College. Under the famous ylem of Law, he acquired temporary opulence, but was soon again reduced to penurious circumstances. He then retired from the world, studying and exercising that philosophy which raised him above it. He died at Paris in 1750, at the age of 80 years. His works are, “A Critical Dissertation on Homer’s Iliad;“ “Reflections in favour of Law’s System;“ “Sethos,“ a moral romance; “A Translation of Diodorus Sicius,“ 7 vols. 12mo. with preface, notes, and fragments. It was one of Terraison’s sayings, “What is the most credulous of all things? Ignorance. What is the most incredulous? Ignorance."

Andrew Terrasson, the elder brother of the former, a priest of the Oratory, was a celebrated preacher, and died at Paris in 1723. His “Sermons," in 4 vols. 12mo. were published in 1726, and reprinted in 1736.

Gaspard Terrasson, another brother, and priest of the Oratory, was more celebrated as a preacher than the former, and officiated at Paris during five years. Having incurred persecution, he quitted the pulpit and the congregation of the Oratory. He died at Paris in 1752. His “Sermons," in 4 vols. 12mo. appeared in 1749. His anonymous work, entitled “Lettres de la Justice Christian," was censured by the Sorbonne.

Another perfon of the same family, viz. Mathew Terrasson, was born at Lyons in 1660, studied the law, and pleaded causes with great reputation. He was for some time an advocate in the “Journal des Savans," and also censor royal. He died, much esteemed, at Paris, in 1734. A “Collection of his Pleadings, &c. was published in 1740.

The son of the preceding, Anthony Terrasson, was born at Paris in 1703, brought up to the bar, and excelled in jurisprudence. By order of chancellor d’Aguesseau, he composed a “History of Roman Jurisprudence," with a collection of Ancient Contracts, &c. in fol. 1750. In 1760 he was promoted to the chancellorship of Dombes, and died in 1752. He was the author of “Melanges d’Histoire, de
TERRELLA, or LITTLE EARTH, is a magnet turned
of a jaff spheroidal figure, and placed so as that its pole,
equator, &c. do exactly correspond with those of the world.
It was thus first called by Gilbert, as being a just repre-
sentation of the great magnetic globe we inhabit.
Such a terrella, if nicely poised, and placed in a meridian
like a globe, it was supposed, would be turned round like the
earth in twenty-four hours by the magnetic particles per-
ving it; but experience has shown this to be a mistake.
TERRE-PLEIN, in Fortification, the top, platform, or
horizontal surface of the rampart, on which the cannon are
placed, and the defenders perform their office.
It is thus called as lying level, having only a little slope
outwardly to bear the recoil of the cannon.
It is terminated by the parapet on that side towards the
champaign; and by the inner talus on that side towards the
place. Its breadth is from 24 to 50 feet.
TERRESCHOW, in Geography, a town of Bohemia,
in the circle of Pilzen; 16 miles N.E. of Pilzen.
TERRESA, one of the Nicobar islands, about fifteen
miles long, and from two to five broad, of an oval form.
N. lat. 8° 20'. E. long. 93° 30'.
TERRESTRIAL BIRDS. See Birds.
TERRESTRIAL GLOBE. See GLOBE.
TERRESTRIAL LINES. See Line, Terrestrial.
TERRESTRIAL PARADISE. See Paradise.
TERRESTRIAL ROADS. See Road.
TERRE-TENANT, is he who has the actual pos-
session of the land, otherwise called the occupant. See
TENANT and OCCUPANT.
Thus a lord of a manor having a freetholder, who letteth
out his freehold to another to be occupied, this occupier
who has the actual possession is called the terre-tenant.
TERRE-VERTE, in the Colour-Trade, the name of a
green earth much used by painters, both finely for a good
flaming green, and in mixture with other colours.
The name is French, and signifies green earth.
It is an indurated clay, of a deep bluish-green colour,
and is found in the earth, not in continued strata or beds, as
most of the other earths are, but in large flat masses of dif-
f erent sizes, imbedded in other strata; these break ir-
regularly in the cutting, and the earth is generally brought
out of the pit in lumps of different sizes. It is of a fine,
regular, and even structure, and very hard. It is of an even
and glossy surface, very smooth to the touch, and in some
degree resembling the morocthus, or French chalk, but
adhering firmly to the tongue. It does not flain the hands
in touching it; but being drawn along a rough surface, it
leaves an even white line, with a greenish call.
It does not ferment with acids, and is burnt to a dusky
brown colour.
It is dug in the island of Cyprus, and in many parts of
France and Italy. That from the neighbourhood of Ve-
rona has been used to be esteemed the best in the world; but
of late there has been some dug in France that equals it.
There is also an earth dug on the Mendip hills, in the linking
for coals, which, though wholly unobserved, is nearly, if not
wholly, of equal value.
When scraped, and the finer parts separated, it is ready
to be made up with oil for the use of the painters, and makes
the most true and lasting green of any simple body they use.
Hill and Da Costa. See Berg-Graen and Verditer.
TERRIAULY, in Geography, a town of Bengal;
20 miles N.W. of Rajamal.
TERRIAH, a town of Hindustan, in Rohilcund; 7
miles S. of Berolly.
TERRIER, or TERRAR, in our Ancient Customs, a
collection of acknowledgments of the wafals or tenants of a
lordship, containing the rents, services, &c. they owe their
lord, and serving as a tile or claim for demanding and exe-
cuting the payment of them.
At present, by terrier we mean no more than a book or
roll, in which the several lands, either of a private person,
or of a town, college, church, &c. are described. The terrier
should contain the number of acres, and the fite, boundaries,
tenants' names, &c. of each piece or parcel. See Domes-
Day.
TERRIER also denotes the lodge or hole which foxes,
badgers, rabbits, &c. dig themselves under ground, and
in which they fave themselves from the purfuit of the
hunters. Hence,
TERRIE, TERRARIUS, is also used for a kind of little hound
to fhunt fothc animals, which, like a ferret, creeps into the
ground, and by that means affrights and bites them; either
fearing them with his teeth, or else halving them by force out
of their holes. See Doc and Hound.
TERRIER, in Geography, a town of Africa, on the
Senegal; 25 miles S. of Cayar.
TERRIER ROUGE, a town of the island of St. Domingo;
15 miles E.S.E. of Cape Francois.
TERRIFICATIO, a word used by some chemical
writers to exprrefs the coalition of the earthly particles of
fome bodies after fermentation, or during the time of it.
TERRILS or TERRILLS PALS, in Geography, a poft-
town of the county of Welfmorth, Ireland; 40 miles W.
from Dublin.
TERRIMUNGALUM, a town of Hinduflan, in the
Carmatic; 25 miles N. of Trithchinopoli.
TERRIORE, a town and fortrefs of Hinduflan, in the
Carmatic; 24 miles N. of Trithchinopoli. N. lat. 11° 12'.
E. long. 78° 45'.
TERRIS BONIS et Catallis, Rebaudendi pot Purificationem,
in Locis, utrwm ex, fcribatur pro f reconciliacione, pro
qui, ut ille, fors, in prufcriptione, et delibcrc in ui
rectum, et atque falcum, qui ille, in prufcriptione, et deliberc
in vi
rectum, et atque falcum, qui ille, in prufcriptione, et deliberc
no temporal jurisdiction; and therefore an ecclesiastical judge cannot arrest any body, not even a priest. It is much in this sense that Cutjas says, the church has an ancient, but no territory.

Territory or District of Columbia, in Geography, a district of America, ceded to the United States by thofe of Maryland and Virginia, and established in the year 1800 as the seat of general government. It is beautifully situated on both sides of the Potomac river, between 38° 48' and 38° 50' N. lat., and 7° E. and 7° W. long. from Washington, the capital. The capital is about 77° 0' 22" W. from London. It is bounded on the N.E., S.E., and partly N.W., by Maryland; and on the S.W., and partly N.W., by Virginia: in extent it is ten miles square, and contains an area of 6,500 square miles. The face of the country is elegantly variegated, and affords a great number of beautiful prospects, of which the Potomac river is the leading feature. This district affords a variety of streams and springs for watering the city, and for other purposes: its rivers are the Potomac or Potomac, the Tiber creek, Reddy creek, Rock creek, and Four-mile Run. The foil is thin and sandy, but faceable to improvement; and the climate is discriminated by a variable spring, a pretty warm summer, an agreeable autumn, and a variable, often very cold, winter.

Topographical Table.

<table>
<thead>
<tr>
<th>Counties</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Washington city</td>
<td>8208</td>
</tr>
<tr>
<td>Georgetown, situated W. of the city</td>
<td>4948</td>
</tr>
<tr>
<td>Washington county, exclusive of the city</td>
<td>2315</td>
</tr>
<tr>
<td>Alexandria, on the W. bank of the river, in the lower part of the district</td>
<td>7227</td>
</tr>
<tr>
<td>Alexandria county, exclusive of the town</td>
<td>1325</td>
</tr>
</tbody>
</table>


Territory, Illinois, a territory of America, and likely to become one of the most important states in the Union, is situated between 37° and 41° 45' N. lat., and 80° 15' and 90° 15' W. long. from Washington city; and is bounded on the N. by the North-west territory, on the S. by Kentucky, on the E. by Ohio, and on the W. by Illinois territory. Its extent from N. to S. is 340 miles, and from E. to W. 143 miles. Its area contains 24,000 square miles, or 21,760,000 acres. The aspect of the country is hilly, but not mountainous; its scenery rich and variegated; and it abounds with plains and large prairies. Its rivers are the Ohio, Wabash, White-water, Tippecanoee, Illinois, and St. Joseph: its minerals are coal, lime-stone, free-stone, salt, and silver. The soil is generally rich and fertile; and its produce grain, grapes, and fruit, and in the south, cotton. Its climate is temperate, pleasant, and favorable. Its legislature consists of a house of representatives and senate; the former elected annually, and the latter every three years; they must hold no office of profit when elected. The executive consists of a governor and lieutenant-governor; both elected for three years, and capable of being re-elected once; the former has a compensation of $1000 dollars per annum, and the latter two dollars per day, while the legislature is in session. Its judiciary administration is composed of a supreme and circuit court: the former composed of three judges, appointed by the governor and senate for seven years; with a salary not exceeding $600 dollars per annum; the latter consists of a presiding judge and two associates, who hold courts in each county: the presiding judge appointed by the joint ballot of the legislature for seven years, and the associates elected by the people for seven years: sheriffs, clerks, and justices, are elected by the people; the sheriff for three years, the clerks and justices for seven years. The militia officers are elected by those who are subject to military duty; and all above colonel, by the commissioned officers. A state bank is to be established at the seat of government, with one branch for every three counties; and the branch banks must have 30,000 dollars in specie each, before they begin to act. Involuntary slavery is forever excluded. The constitution may be amended in 12 years: Corydon is to be the seat of government for nine years. The congress, in creating the Indiana territory into a state, appropriated, in addition to the school section, an entire township of land for the support of a seminary of learning, and four fections for fixing the seat of the state governor.

Topographical Table.

<table>
<thead>
<tr>
<th>Counties</th>
<th>Population</th>
<th>Chief Town</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clark</td>
<td>5370</td>
<td>Jeffersonville</td>
</tr>
<tr>
<td>Dearborn</td>
<td>7340</td>
<td>Lawrenceburg</td>
</tr>
<tr>
<td>Franklin</td>
<td>3595</td>
<td>Corydon</td>
</tr>
<tr>
<td>Gibson</td>
<td>3595</td>
<td>Vincennes</td>
</tr>
<tr>
<td>Harrison</td>
<td>7945</td>
<td>Vevay</td>
</tr>
<tr>
<td>Jefferson</td>
<td>7945</td>
<td></td>
</tr>
<tr>
<td>Knox</td>
<td>7945</td>
<td></td>
</tr>
<tr>
<td>Switzerland</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Washington</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Wayne</td>
<td>2455</td>
<td></td>
</tr>
</tbody>
</table>

* Laid off since last census. Melish. See Indiana.

Territory, Michigan, a district in America, which, in 1796, was denominated Wayne county, has lately been erected into a territorial government, and organized with the usual offices and powers. It is situated between 41° 45' and 45° 33' N. lat., and 80° 15' and 80° 15' W. long. from Washington; and is bounded on the N. by the limits of Michilimackinac, on the S. by Ohio and Indiana, on the E. by Lakes Huron and St. Clair, and Upper Canada, and on
on the W. by lake Michigan. Its extent from N. to S. is 234 miles, and from E. to W. 138 miles. Its area contains 27,000 square miles, or 17,280,000 acres. The central part of this territory is high, and from this is a defect in all directions.

The rivers are St. Mary's, Huron, Detroit, Black, Manatee, Grand, Credit, Kish, &c. The soil is generally rich and fertile, and produces wheat, oats, barley, rye, corn, potatoes, fruit, &c. The climate is temperate and salubrious; winter lasting from the middle of November to the middle of March.

**Topographical Table.**

<table>
<thead>
<tr>
<th>District</th>
<th>Population</th>
<th>Chief Town</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detroit</td>
<td>2227</td>
<td>Detroit</td>
</tr>
<tr>
<td>Erie</td>
<td>1340</td>
<td></td>
</tr>
<tr>
<td>Huron</td>
<td>580</td>
<td></td>
</tr>
<tr>
<td>Michilimackinac</td>
<td>615</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>4762</strong></td>
<td></td>
</tr>
</tbody>
</table>

Morse and Melish. See Detroit.

**TERRITORY.** Mississipi, an improving country of America, which, it is presumed, will be divided into two states, the Tombigby being the boundary. It is situated between 30° 15' and 35° N. lat., and 8° and 14° 32' W. long, from Washington city; and bounded on the N. by Tennessee, on the S. by Louisiana, West Florida, and the gulf of Mexico, on the E. by Georgia, and on the W. by Louisiana and Missoury territory. Its extent from N. to S. is 312 miles, and from E. to W. 324 miles; and its area comprehends 89,000 square miles, or 56,960,000 acres. Its general aspect is, towards the south, level, to the north, elevated and beautifully diversified, and on the north-east are some spurs of the Alleghany mountains. The soil, generally good, and in many places excellent, produces cotton, corn, rice, wheat, rye, oats, some sugar, and indigo. The climate is much commendable; the winters being mild, and the summers not warmer than several degrees to the northward.

**Topographical Table.**

<table>
<thead>
<tr>
<th>District</th>
<th>Population</th>
<th>Chief Town</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cape Girardeau</td>
<td>4888</td>
<td>Cape Girardeau</td>
</tr>
<tr>
<td>New Madrid</td>
<td>2103</td>
<td>New Madrid</td>
</tr>
<tr>
<td>St. Charles</td>
<td>3505</td>
<td>St. Charles</td>
</tr>
<tr>
<td>St. Louis</td>
<td>5667</td>
<td>St. Louis</td>
</tr>
<tr>
<td>St. Genevieve</td>
<td>4620</td>
<td>St. Genevieve</td>
</tr>
<tr>
<td>Settlements of Hope</td>
<td>188</td>
<td>Field and St. Francis</td>
</tr>
<tr>
<td>Ditto on Arkanfaw</td>
<td>874</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>20845</strong></td>
<td></td>
</tr>
</tbody>
</table>

Melish. See Missouri.

**TERRITORY.** North-West, an extensive territory of America, not yet organized into a regular government, is situated between 41° 45' and 40° 37' N. lat., and 76° and 158° 30' W. long, from Washington city; and bounded on the N. by Upper Canada and Lake Superior, on the S. by Indiana and Illinois territory, on the E. by Upper Canada and Lake Michigan, on the W. and S.W. by Missippic river, which divides it from the Missoury territory. Its extent from N. to S. is about 360 miles, and from E. to W. 456 miles; and its area contains about 147,000 square miles, or 94,080,000 acres. The face of the country is generally undulating, in some places hilly, but not mountains. Its rivers are the Missippic, Ouicofon, Fox, Monomonic, Chippeyow, &c. The soil is mostly excellent; and the climate, towards the south, is pleasant, and to the north, cold. Few settlements have yet been made in this extensive region, and the inhabitants were not included in the last census. Melish.

**TERRITORY of Orleans.** See Louisiana, Orleans, and United States.

**TERROR.** The effect of terror, or of sudden frights, in the disease, is often very great.

It is generally observed, that people who are most afraid of the plague of time of contagion, catch the infection sooner; and that those who are most terrified and disillusioned at first in the disease, generally die of it. It is indeed uncertain, whether this be attributed to the terror, or whether the terror itself, as a consequence of dejection of spirits, be not merely a symptom of the disease. Kerkring, Spicili, Anat.

Sudden frights, in acute disease, have evidently killed many,
many, by the agitation into which they have thrown the
spirits, already too much disordered. We have also accounts
of persons absolutely killed by terrors, when in perfect health.
At the time of receiving the flock from them: people ordered
to be executed, but with private orders for a reprieve, have
expired at the block without a wound.

The general effects of terror are a contraction of the small
vessels, and a repulsion of the blood in the large and internal
ones; hence proceed the suppression of perspiration, the gen-
eral oppression, trembling, and anguish of heart and lungs
overcharged with blood, &c.

When a person is affected with terror, the principal endea-
avour should be to refile the circulation to its due order, to
promote perspiration, and to allay the agitation of the patient.
For these purposes he may drink a little warm liquor, as
chamomile tea, &c.: the feet and legs may be put into warm
water, the legs rubbed, and the chamomile tea repeated every
six or eight minutes; and when the skin is warm, and there
is a tendency to perspiration, feep may be promoted by a
gentle opiate.

TERRYS, in Geography, a town of Bengal; 30 miles
neath.

TERSA, a small river of Russia, which runs into the
Medvedizta, in the country of the Coftacs. N. lat. 50° 30'.
E. long. 44° 34'.

TERSCHEUREN, a town of Guelderland; 7 miles E.
of Amersfort.

TERSEKAN, a river of Russia, which runs into the
Ikhim, N. lat. 52° 30'. E. long. 67° 34'.

TERSHIZ. See Ter Shish.

TERSION, Tersio, formed of Tero, I wear, the act of
wiping or rubbing a thing. See ABRASION.

TERTA, in Ancient Geography, a town situated, accord-
ing to Ptolemy, in the interior of Thrace, between Sardica
and Philippopolis.

TERTHON, a word properly signifying the extreme
part of the tail-yard in shipping. Hippocrates uses it in a
metaphorical sense, to express the extremity of a disease.

TERTIAN, in Medicine, a species of intermitting fever,
of which the familiar paroxysms occur at an interval of about
forty-eight hours. See FEVER.

TERTIARY is also an old measure, containing eighty-four
gallons, so called because it is the third part of a tun. 1 R. III.
c. 13. 2 H. VI. c. 11.

TERTIARIA, in Botany, a name given by some
authors to the fecullaria, or hooded willow-herb. J. B. Ollin,
vol. iii. p. 435.

TERTIARY Canons. See CANONS.

TERTIAS, a word used very frequently in the writings
of physicians, with the addition of ad; but it is capable of
a double signification. Ad tertias is often used to express
how far the liquor is to be boiled away in the medical de-
cotions; yet it may in this case signify either the boiling
to two-thirds, or to one-third part, of the whole. The more
usual sense, however, is to boil away one-third part of the
original liquor; and in the same manner to fill a vessel ad tertias,
does not signify to fill a vessel one-third part full, but two-
thirds, leaving only one empty.

TERTIATE, in Gunery. To tertiate a great gun, is
to examine the thickens of the metal at the muzzle, whereby
to judge of the strength of the piece, and whether it be suf-
ficiently fortified or not.

This is usually done with a pair of caliper compasses.
The term is also applied to any piece of ordnance for find-
ing whether it has its due thickens at the vent, trunnions,
and neck; if the trunnions and neck are in their due order,
and the chafe straight, &c.

TERTII internodii pollicis extensor, in Anatomy. See
EXTENSOR.

TERTIO adiacente, Propositio de. See PROPOSITION.

TERTIVERI, in Geography, a town of Naples, in Cap-
tanzana; 7 miles N.W. of Troja.

TERTIUM SAL, a third salt, a term used in Chemistry
to express a salt resulting from the mixture of an acid and an
alkali, which partakes of the nature of both, as to be itself
neither acid nor alkal, but neutral.

TERTRE, John Baptist du, in Biography, a mission-
ary and writer of history, was born at Calais in 1610:
and having served in the army in early life, he joined the
Dominicans at Paris, and made his profession in 1635, assum-
ing the name of John-Baptist instead of James. About five
years afterwards, he was sent as a missionary to the French
American islands, where he collected materials for the work
which engaged his attention after his return to France in
1658: that was his "Histoire Generale des Antilles habitees
par les Francois," 4 vols. 4to. 1667—71. After having
hilled various polks in the houles of his order, he died at Paris
in 1687. Moret.

TERTUA, in Geography, a town of Hindoostan, in
Bahar; 52 miles E. of Bhabar.

TERTULLIAN, Quintus Septimius Florens Ter-
tullianus, in Biography, generally reckoned the most an-
cient Latin father extant, was born at Carthage, not long
after the middle of the second century. He was the fon of
a proconfular centurion, or military officer under the pro-
confal of Africa, and well acquainted with the Roman laws,
though he does not seem to have practifed the law as a pro-
feffion. He was also intimately converfant with the Greek
and Roman poets, historians, orators, and philosophers,
and other heathen writers of every description. His Dill in
Greek was fo considerable, that he wrote several books in that
language. It has been inferred from his parentage, and from
some expressions in his works, that he was once a Heathen;
but the time and circumstances of his conversion to Chris-
tianity are not known. Cave supposes that he embraced Christi-
anity about the year 185, and was made a prebyster of the
church of Carthage about the year 192. According to Du
Pin, he flourifhed chiefly from about the year 194 to 216.
Tillemont is of opinion that he was born in 160, and that
he died about the year 245, when he was between 80 and 90
years of age, having lived, as St. Jerom fays, to an extreme,
or decrепit, old age. Cave conjectures that he died about
the year 220. It is faid that he was married, probably after
his conversion to Christianity. Having been a member of
the Catholick church for many years, he separated from it
and became a Montaniit, as Cave fays, about the year 199,
but about 205, according to Tillemont. Different accounts
have been given of this change; but the most probable feems
to be, that the fpecious pretences of the Montaniits to greater
mortification in fairs and continence had an influence on his
temper, which was fevere. But whatever might have been
his reafons for adopting the principles of Montaniiti, they
feem to have made fo little alteration in him as an author,
that there are few of his pieces, concerning which it is not
easy to determine, whether they were written by Tertullian
a Montaniit, or Tertullian fills a Catholick. Although, in con-
fquence of this change, his reputation funk in the church,
et it produced no feparation between him and other Chri-
tians, except in point of discipline, which, agreeably to his
temper, he wished to be harsh and rigorous. His doctrine
remained the fame with that of the Catholicks. In process of
time, however, he believed the divine inspiration of Mon-
tanus and his two prophetfes, Priscilla and Maximilla, and
that they were thus enabled to make further discoveries than
had
had before been made, for the greater perfection of Christians. He approved of the longer, more strict, and more frequent fasts of the Montanists; he condemned all second marriages; and denied that the church was authorized to receive again into communion any who were chargeable with fornication, adultery, or any such offences, after baptism. He often arrogantly calls his own people spirituall, and the Catholics, as contemptuously, animal or carnal. We have already observed that his knowledge was extensive; his fancy also was lively; and though his temper was severe, and his mode of expression vehement and positive, yet his writings frequently manifest unaffected humility and modesty. The character given of his style by Lactantius must be universally allowed; that it is "ruined and unpolished, and very obscure;" and yet, as Cave observes, "it is lofty and masculine, and carries a kind of majestic eloquence along with it, that gives a pleasant reli
to the judicious and inquisitive reader." His books still exist, though many are lost, are numerous, some of which were written before and others after he embraced the errors of Montanism. Of these, the Apology is reckoned his principal work; and has been highly commended both by ancient and modern writers; whilst his other performances are written with wit and force, and are edifying and instructive. The time when his "Apology" was written has been differently stated by various authors: some refer it to the year 200, others to 203 and 205; but Mosheim, after laborious examination, concludes that it was composed in the year 198. All allow that it was written before he joined the Montanists. Learned men generally agree, that it was not addressed to the senate of Rome, but to the governors of provinces, or perhaps to the proconsul of Africa, and the chief magistrates residing at Carthage, where it was written, according to Lardner; though others are of opinion that it was written at Rome. From this Apology, it appears that Christians underwent a variety of grievous sufferings; they were, as he says, "cruci"ed, hung upon stakes, burnt alive, thrown to wild beasts, condemned to the mines, and banished into de
ter islands." That this was the case, appears also from Tur
tullian's book to the proconsul Scapula, not written before the year 211 or 212. The "Apology" is written for the purpose of proving the injustice of the persecutions inflicted upon Christians, and the falsehood of the charges brought against them; and likewise to display the excellence of the Christian religion, and the folly and absurdity of that of the Heathens. His two books "Ad Nations" are connected with his Apology, and indicate his characteristic vehemence. His address to Scapula, already mentioned, was written under the emperor Caracalla, and contains an avowal of admir
able principles. "It ought," he says, "to be left to the free choice of men, to embrace that religion which seems to them most agreeable to truth. No one is injured or benefitted by another man's religion; it is not an act of religion to force religion, which ought to be adopted spontaneously, not by compulsion." He proceeds to vindicate the conduct of Christians, and to shew that their religious principles induced them to pay entire obedience to the emperors, and that therefore they did not deserve to incur the penalties of trea
ton. Another work of Tertullian has been often cited, viz. "De Praescriptionibus adversus Haecatom." In this work he treats of hereby in general, and then discourses particular herebys in his five books against Marcion, in others against Praxedis, in defence of the Trinity, and against Hermogenes, and the Valentinians. In his book "On the Soul," he inquires into the nature of the soul and its properties. In his treatise "On Baptism," he ably maintains that the moral stain of the soul is effaced by the external washing of the body, and that punishment is likewise remitted; a doctrine which some late divines have zealously supported. Baptism, by heretics he considers as no baptism, and contends that it ought to be repeated. In cases of necessity, he thinks infant
baptism to be allowable, but he recommends deferring rather than halting the administration of this sacrament. His book "On Penance" refutes the opinion advanced by the Montanists, that sins committed after baptism cannot be ab
solved by the church. In his treatise "On Idolatry," he extends this crime to practices that are almost unavoidable in society; such as bearing arms for the defence of the empire, adorning houses in honour of the prince, and using customary expresions that have any reference to Heathen mythology. In his work "De Corona Militis," he applauds a Christian officer who refused to place a crown or garland on his head. In another work he considers "flight in time of persecution" as prohibited, and also giving money to escape it. In his treatise "De Spectaculis," he diffuses Christians from attending public shows. In his moral tracts an exhortation to "patience" in which, as well as in a discourse addressed to martyrs or confessors, he dwells in an eloquent strain on the motives which should bind a Christian to the practice of that virtue. After his union with the Montanists, Tertullian wrote four books in opposition to the discipline of the Ca
tonies to all the books of the New Testament, commonly received by Christians at this time, except the Epistle of James, the 2d of Peter, the 2d and 3d of John, The Epistle to the Hebrews he ascribes to Barnabas. This ancient father has been much admired: Cyprian calls him "my master." Some persons, however, have doubted whether he has done more good or harm in the Christian church. His character is judiciously appreciated by one of his biographers (Gen. Biog.) in the following manner. Tertullian "was certainly a man of lively parts and large acquirements, of copious invention, and warm feelings. In his reasonings, however, he displayed more fancy and futility than sound judgment; and the ardour of his temper inclined him to violence and exaggeration, while a propensity to superstitition renders him weak and credulous and gullibly alert." His works have been frequently printed both separately and collectively. Of his whole works, the editions of Rigaltius, fol. Paris, 1641, and of Semler, Hist. Mag. 6 vols. 1770–76, are most esteemed. Dupin. Lardner. Mohrm.
hence, as the as contained twelve ounces, the tertius contained three, whence the name, which is formed of the Latin ter unus.

Tertius was also used for the quarter of the denarius, so that when the denarius was at ten asses, the tertius was worth two and a half; and when the denarius was riven to sixteen, the tertius was worth four. See Denarius.

TERVOLA, in Geography, a town of Sweden, in the Lamark of Kemi; 116 miles N. of Kemi.

TERWALDE, a town of Holland, in the department of Guelderland; 12 miles S. of Hattem.

TERZA, a town of Naples, in the province of Otranto; 15 miles S.E. of Matera.

Terza, Ital. the 3d in Music. The terza maggiore, or major 3d, is four semitones, or half notes, above the base; the terza minore, or minor 3d, is three. See Concordes and Intervals.

Tartini has added the above, and even given us a 3d found to discords.

"The same thing will happen if the same intervals are founded by two players on the violin, distant from one another about twenty-nine or thirty feet; always using a strong bow, and holding out the notes. The auditor will hear the third found much better, if placed in the middle between them, than if nearer to one than the other. Two hautbois produce the same effect placed at a much greater distance, and even when the earner is not in the middle, and still more if he is." Tartini has been unfairly treated by d'Alembert, M. Serre, and other French writers, who not only dispute his system built on the terza fuono, his own discovery, but give the discovery itself to another.

D'Alembert accuses him of writing in a manner so obscure, that it is impossible to form any judgment of his intentions; yet he is obliged to own that the subject itself is obscure, metaphysical, and uncertain. As to the obscurity in the phenomenon itself, we deny it; the third found, produced by two other sounds, we have always found, from innumerable experiments with two voices, two instruments, two founds on one instrument, as double flaps on a violin, violoncello, and on an organ, that the third found thus produced in the medium was the true fundamental base, such as Tartini himself has expressed by musical notes.

D'Alembert and all the French writers on the subject, have flated the cause (except Rouffeau) in a difingenious manner. Even when disputing Rameau's principles, they wish to keep him above Tartini and all foreign claims to original discovery or improvement in music. Rouffeau is envied for being the first to abufe the old French music, even by those who thought and allowed it to be had in their other writings. See the Abbé Arnaud and M. Suard's critique upon his Dictionnaire de la Musique, with those of the Abbé Rouffer, M. Laborde, &c. &c.

Terzo, in Geography, a town of France, in the department of the Tanaro; 2 miles S.W. of Acqui.

TERZOLA, in Botany, a name by which some authors have called the eupatorium cannabinum, or water hemp-agarimony.

TERZOWITZ, in Geography, a town of Bohemia, in the circle of Rakonitz; 7 miles S.S.E. of Rakonitz.

TERZETTO, in the Italian Music, a little tune or air in three parts. See Trio.

TERZINI, Ital. impelis, in the language of practical musicians, triplets, or three notes in the time of two.

TERZO Sesto, Ital. the third found, discovered by Tartini to be produced in the medium by two founds that can be sustained, and which third found is the true fundamental base. Upon this harmonic phenomenon Tartini has founded his system; and Mr. Stillingsfleet, in his "Principles and Power of Harmony," describes the terzo fuono in the following manner.

"Two founds being given on any musical instrument, which will admit of being held out for any time, and of being strengthened at pleasure, as in the trumpet, the German horn, the violin, hautbois, &c. a third found will be heard. On the violin, let the notes C E, C E, B E, B flat, G, be founded with a strong bow, the third found will be heard in the following manner.
of the Lacian Juno and the town of Locri, according to Diodorus Sculus.

TESE, in Geography. See TEST.

TESEGNDELT, a town of Morocco, situated on a sharp rock; supposed to be impregnable; 80 miles W.N.W. of Morocco.

TESEN, a town of Afasti Turkey, in Natolia; 34 miles S.E. of Dignizulu.

TESEREN, a town of Africa, in the country of Tafilat; 50 miles N.N.W. of Tafilat.

TESHO-LOOMBOO, or Lubron, the residence of the Teshoo Lama, and the capital of that part of Thibet immediately subject to his authority, is situated in N. lat. 29° 4' 29". E. long. 89° 7'. It is a large monastery, consisting of three or four hundred houses, the habitations of the Gyongs, or priests, besides temples, mausoleums, and the palace of the sovereign pontiff; in which is comprised also the residence of the, regent, and of all the subordinate officers, both ecclesiastical and civil, belonging to the court. It is included within the hollow form of a high rock, and has a southern aspect. Its buildings are all of stone, none less than two stories high, flat-roofed, and crowned with a parapet rising considerably above the roof, composed of heath and brufh-wood, interspersed between frames of timber, which form a ledge below, and are fashioned above into a cornice, capped with masonry. The building is flanked of a deep garnet-colour; a custom universally adopted in these regions, for distinguishing places of religious establishment, and which, when contrasted with the white walls, produces, in the appearance of their town, a very pleasing effect. All the houses have windows, the centre, or principal one, projecting beyond the walls, and forming a balcony: they are closed with black mohair curtains instead of shutters. The principal apartment in the upper story has an opening over it, covered with a moveable shed, which serves the purpose of sometimes admitting light and air, and in the winter season, occasionally, the grateful warmth of the sun. The tops of the walls are adorned with cylindrical monuments: some of which are plain, covered with black cloth, crossed by a white fillet; while others are made of copper, burnished with gold: as the palace and mausoleums are thus adorned with profusion, the view of the monastery, on approaching it from the plain, is brilliant and splendid. The plain of Teshoo-Loomboo, which is perfectly level, is encompassed by rocky hills: its length is about fifteen miles, and its southern extremity, from E. to W., is five or six miles broad. The rock, upon the southern face of which the monastery is situated, nearly occupies the whole width of the valley, and approaches so near to the hills, as to form a narrow defile, leaving room only for a road, and the bed of the river Painom-tchieu, which runs through it, and at a small distance joins the Burhampooter. A fortress commands the pafs. The rock of Teshoo-Loombo is the loveliest of all that are in its vicinity; and the monastery near its base is thus guarded from the violence of the N.W. winds. From the summit of this rock the eye commands a very extensive prospect, and the most interesting object in view is the celebrated river Burhampooter, called in the language of Thibet Erechoombo. Here it receives the tributary waters of the Painom-tchieu. Turner's Tibet.

TESI TRAMONTINI, VITTORIA, in Biography, one of the most renowned female singers that Italy has produced. She was born at Florence in 1690; began her vocal studies under the maestro di cappella Francesco Redi; then went to Bologna, and became a pupil of Campoggi; and received her last polish from Bernacchi. But she was no less admired for the dignity, grace, and propriety of her action, than her vocal powers.

Quantz, who heard her at Dresden in 1719, in the famous opera that was performed on occasion of the nuptials of the prince royal of Poland, sung with Senofino, the Berelli, wife of Lotti, Durefante, and the Faubel, characterizes her in the following matterly manner.

"Vittoria Tesi had by nature a masculine, strong, contralto voice. In 1719 she generally sung, at Dresden all' osteo, such airs as are made for bass voices; but afterwards, besides the majestical and serious style, she had occasionally something coquettish in her manner, which was very pleasing. The compass of her voice was so extraordinary, that neither to sing high nor low gave her trouble. She was not remarkable for her performance of rapid and difficult passages; but she seemed born to captivating every spectator by her action, principally in male parts, which she performed in a most natural and intelligent manner." Life of Quantz, written by himself.

She sung at Naples in 1725, and at Vienna in 1748, where she remained till the time of her decease, in 1775, at 85 years of age.

She was the mistress of the Teuberm and the De Amics, both as justly famed for their acting as singing.

We were told at Vienna in 1772, that she had long quitted the stage, though the remembrance of her talents was so deeply impressed in the minds of many excellent judges, that whenever she was mentioned, it was to the disadvantage of all subsequent female singers. She had been very sprightly in her day, and yet was in high favour with the empress-queen in her latter years. Her story is somewhat singular. She was connected with a certain count, a man of great quality and distinction, whose fondness increased by possession to such a degree as to determine him to marry her; a much more uncommon resolution in a person of high birth on the continent, than in England. She tried to dissuade him: enumerated all the bad consequences of such an alliance; but he would listen to no reasoning, nor take any denial. Finding all remonstrances vain, she left him one morning, went into a neighbouring street, and addressing herself to a poor labouring man, a journeyman baker, said she would give him fifty ducats if he would marry her; not with a view to their cohabiting together, but to serve a present purpose. The poor man readily consented to become her nominal husband; accordingly they were formally married; and when the count renewed his solicitations, she told him it was now utterly impossible to grant his request, for she was already the wife of another; a sacrifice she made to his fame and family.

Since that time she had lived many years with a man of great rank at Vienna, of nearly her own age; probably in a very chaste and innocent manner.

TESIA, in Geography, a town of New Mexico, in the province of Mayo; 45 miles E.S.E. of Santa Cruz.

TESIN, a town of Syria, celebrated for its olive oil; 18 miles N.E. of Antioch.

TESINO, a department of Italy, formed of the Paves. It contains 156,471 inhabitants, who elect twelve deputies. Pavia is the capital.—Alfo, a river of Italy, which rises in mount St. Gotard, and passing through lake Maggiora, empties itself into the Po, at Pavia. 

TESIO, or Tjel, a town of the county of Tyrol; 24 miles N.E. of Trent.

TESKELA, a town of Finland; 70 miles E. of Bierneberg.

TESKOWA, a town of Poland, in Volhynia; 40 miles E. of Luckow.
TESORO, a small island in the Spanish Main, near the coast of South America. N. lat. 10° 8'. W. long. 75° 45'.

TESPIS, in Ancient Geography, a town of Asia, in the interior of Carmania, and near Carmania. Ptol. 

TESSALACH, a town of Algiers; 20 miles S. of Oran.

TASSALON. See Thessalon.

TASSARACONTA, TESSARACONTA, among the Athenians, were forty men who went their circuits round the several boroughs, and had cognizance of all controversies about money, if not above ten drachms; as also of actions of assault and battery. Potter, Archzol. Grec. 

TASSARACONTERIS, in the Naval Architecture of the Ancients, a word used to express a fort of galleys, in which there were no less than forty tiers of rowers one above another. See Enneris and Polykrot. 

TASSARACosta, in our Ancient Writers. See Quadragesima.

TASSARACOSTON, TESSARACOSTON, in Antiquity, a solemnity kept by women on the forty day after child-birth, when they went to the temple, and paid some grateful acknowledgments for their safe delivery. Pott. Archzol. Grec. tom. i. p. 432, and tom ii. p. 335.

TASSARINI, Carlo, in Biography, first violin, and leader of the band in the metropolitan church at Urbino, was born at Rimini in 1690; he was a spirited performer on his instrument, and a very voluminous composer. His style was light and flimsy, compared with that of Corelli and Geminiani; but his concertos not being very difficult, were much played in country concerts in our own memory, with those of Albieri, Albimoni, and Vivaldi.

Tassarini’s first publication at Amsterdam has a title-page of great promise; but whether the promise was ever performed, sceptics in these incredulous days will be much inclined to doubt. The title is in French, but literally translated, is the following: “A new Method for learning theoretically, in a Month’s Time, to play on the Violin, divided into three Chasses, with progressive Lessons for two Violins.” Then twelve violin concertos; twelve flute solos; the matter and scholars; divertimenti for two violins; twelve violin solos; six divertimenti for two violins, in canon, &c. &c. He lived till the year 1762, in the perpetual labour of publication; but his productions would now be as difficult to find as those of Timotheus and Olympus.

TESSE, in Geography, a town of France, in the department of the Sart; 15 miles S.W. of Le Mans.

TESSELÆ, a word used in Pharmacy, to express lozenges cut into regular figures.

TESSELARII, among the Romans, artificers of chased or mosaic work.

TESSELATED PAVEMENT, pavimentum tessellatum, a rich pavement of mosaic work, made of curious small square marbles, bricks, or tiles, called tessellae, from the form of dies.

Tessellated pavements were much used in the tents of the Roman generals.

TESSERA, in Roman Antiquity, denoted in its primary sense a cube or dye; so called from the Greek word TESSARA, or TESSA, four; respect being had to its number of sides, distinct from the two horizontal planes, above and below. And it was thus distinguished from the talus, which, being round at each end, contained only four planes or faces on which it could stand: and therefore, when thrown, had no more than two side faces in view. Hence ludere talis et ludere tesserae are spoken of by Roman writers as two different games. The syllable tes occurs often in Roman inscriptions.

The word tesserae was applied to many other things, not so much from a similarity in the figure, as from the relation they bore to some other thing of which they were the sign or token; as the points on the upper plane of the dye denoted the good or ill success of the cast.

The tessera hospitialis was either public or private. As to the former, we find among the inscriptions published by Gruter, instances of two municipal towns which put themselves under the patronage of the Roman governor; and the reciprocal engagements between them, engraven on two copper-plates in the form of an oblong square, with a pediment at the top, is called in both tessera hospitialis.

The design of the latter was to cultivate or maintain a lasting friendship between private persons and their families; and gave a mutual claim to the contracting parties, and their descendants, of a reception and kind treatment at each other’s houses, as occasion offered. For which end these tesserae were issued, as being to preserve the memory of that transactiion to posterity. And one method of doing this was by dividing one of them lengthwise into two equal parts, upon each of which one of the parties wrote his name, and interchanged it with the other. From this custom came the prevailing expression tesserae hospitales confinges, applied to persons who violated their engagements.

The tessera frumentariae were small tassles given by the emperors to the populace of Rome, entitled them to the reception of a quantity of corn from the public at flated feasons. The perfon who had the inspection of these was called tesseraurus. They were made of wood and of stone.

There was another kind of tesserae which intitled perfons to a fight of the public games and other diversions, usuallly made in the form of an oblong square.

The tesserae militaris was a signal given by the general, or chief commander of an army, as a direction to the soldiers for executing any duty or service required of them.

This, upon urgent occasions, was only vocal; but, in ordinary cafes, it was written on a tablet, commonly made of wood. Befide the civil and military tesserae, there are others which related to religious affairs, and may be called facers. Phil. Trans. vol. xiv. art. 12.

TESSERMIUT, in Geography, an island near the S.W. coast of Earl Greeneland. N. lat. 59° 59’. W. long. 44° 22’.

TESET, a town and district of Africa, in the country of Sahara; 170 miles S. of Morocco. N. lat. 15° 24’. W. long. 7°.

TESSIN, Charles Gustavus, in Biography, a Swiss count and considerable statesman, was born at Stockholm in 1695, and received the rudiments of his education under his father. In 1714 he set out on his travels, and continued them through various countries of Europe for five years, availing himself of every opportunity that occurred of acquainting himself with their respective constitution and laws. At the age of twenty-five he was deputed to the courts of Great Britain, Denmark, and France, and also to the States of Holland, to announce the accession of Frederic I. to the Swedh throne; and in 1725 he was sent to Vienna, to solicit the attention of that court to the new treaty of alliance between Sweden and Ruffia. On the death of his father, in 1728, he succeeded him as principal intendant of the court, and in order to qualify himself for the office, he undertook a new tour at his own expense. In 1735 he was again dispatched
to the court of Vienna, where he remained two years. He was chosen by the nobility speaker at the famous diet of 1738, on which occasion he obtained, in recompense of his conduct, a gold medal, bearing on one side his crest, and on the other the motto "Conficius Reici." He was appointed in 1739 to conduct an embassy from this diet to France, and resided at Paris till the year 1742, concluding during this interval an advantageous treaty of commerce with the king of the Two Sicilies, and terminating a subsidary treaty of alliance with France, by which Sweden was to receive in the course of three years 27 tons of gold. In 1743 he was sent to Denmark, and in the following year to Berlin, on business of great importance. At Berlin he was honoured with the Prussian order of the Black Eagle. He occupied several other stations of dignity and trust, the duties of which he discharged with singular wisdom and fidelity. But the most important office assigned him, was that of preceptor to the crown prince, Gustavus III., to which he was appointed in 1747. On this occasion he wrote his "Letters addressed to a Young Prince," for the use of his royal pupil, which were afterwards translated into most of the languages of Europe. Retiring from public business in 1761, he lived on his estate till the time of his death, which happened in January 1770. Count Teflin was a zealous patriot and enlightened citizen, and a distinguished patron of letters. With a view of encouraging the arts and sciences, he made a great collection of books, pictures, drawings, coins, and other curiosities. But notwithstanding his various excellent qualities, his enemies were affiduous in fruitless attempts to throw a shade over his character, as may be seen in a work entitled, "An Historical Account of the State of Sweden under Frederic I." Gen. Biog.

Tessin, in Geography, a town of the duchy of Mecklenburg; 18 miles S.E. of Rostock.

Tessiursak, an island near the W. coast of West Greenland. N. lat. 61° 10'. W. long. 47° 30'.

Tessoua, a considerable town of Africa, in the country of Fezzan; 100 miles E.S.E. of Mourzouk. Near this town, a river, now overwhelmed by the moving sands, but formerly a deep and rapid stream, had its course.

Tessouelle, a town of France, in the department of the Mayne and Loire; 5 miles S. of Cholet.

Tessua, a town of Hindoostan, in Rohilcund; 18 miles S.S.E. of Bereilly.

Tessue, a town of Persia, in the province of Abibdizan; 50 miles W. of Tauris.

Tessuntee, a town of the state of Georgia; 80 miles W. of Tugeloo.

Tessut. See Teceut.

Tessy, a town of France, in the department of the Channel; 9 miles S. of St. I.o.

Test, in Metullurgy, is a vessel of the nature of a coppe1, used for large quantities of metals at once, and formed of the same materials.

The coppers, or small vessels, serve for operations of this kind, when small quantities only are concerned; but when larger are worked on, vessels of a larger size and coarser texture are employed, which are distinguished by the name of teffs.

These are usually a foot and half broad, and are made of woodashes, not prepared with so much care as for coppers-making, and mixed with finely powdered brick-dust; these are made into the proper shape, either by means of a shallow vessel, made of crucible earth, or cast-iron, of proper dimensions, or only an iron ring, or hoop, with three bars arched downwards across the bottom, about two inches deep, and of different widths, from three or four inches to fifteen or more, according to the quantity of metal to be teffed at once.

To make them in the first manner, an earthen vessel is to be procured, not glazed within, and by its depth and breadth proportioned to the quantity of metal to be worked; the inside of this vessel is to be well moistened with fair water, that the ashes to be put into it may adhere the better. Put into this vessel, thus prepared, the ashes and brick-dust before-mentioned, and first moistened either with water alone, or with water with a little white of an egg mixed in it; let the quantity of this be so much as will half fill the vessel, then press the mass with a wooden indented pestle, or, if not for a very large tell, with a wooden cylinder, only of an inch thick: when thus preied down add fresh ashes, and press them a second time, as in the making of coppers, and repeat this addition of fresh ashes till the earthen vessel be nearly full; then remove the superfluous ashes with an iron ruler, and let the inequalities remaining at the border be smoothed with a wooden or glass ball rolled round about. This done, you are to cut the cavity with a bowed iron, that you may have a broad spherical segment, not very deep; and lastly, by means of a fieve, fieve this cavity carefully and regularly over with dry ashes of bones of animals, ground extremely fine, and squeeze the hard in, by the rotation of the wooden or glass ball. Thus you have a tell finished, which, together with its earthen pot, must be fett in a dry warm place.

To make the teffs in the other manner, or by means of an iron ring; let a ring of that metal be filled with ashes mixed with brick-dust, and moistened as before-mentioned, in such manner that they may rise considerably above the ring; then press them strongly either with your hands, or with an indented pestle, and afterwards, with gentle blows of a rammer, press the ashes from the circumference toward the centre, in a spiral line, and that in such manner, that, after having been sufficiently preied, they may be a small matter higher than the brink of the ring. If there are now any vacancies in the mass, empty the ring, and fill it again with more ashes; for if you should attempt to fill up these by adding, were it but ever so little, ashes, the second, or additional quantities, will never cohere so firmly with the first, but that they may probably separate in the operation. This done, turn the ring upside down, and on the other side, or bottom, take out the ashes to the quantity of one-third part of the depth of the ring, and again fill the vacancy with the same ashes, in such a manner that there may remain no sensible cavity.

When the mass is thus prepared, cut out a cavity in the larger surface of the ring, with a bowred iron, as in the former method.

The Germans have, beside these, another kind of teffs, which they call treibfherben. These are a sort of vessels which refill the most violent fire, and are so extremely compact, that they sometimes will retain not only melted metals, but even the glafs of lead itself.

The figure and size of these teffs may be the same with that of the coppers, but they are usually made larger; and the great difference of these teffs from coppers, and from the ordinary teffs, which are only a kind of large and coarser coppers, is, that the matter of these is more compact and coherent.

The matter for making these teffs is thus prepared; take of the pureft and finest clay a sufficient quantity, make it into balls, and dry them either in the air, or on the fire; when dried, beat them to powder in a mortar, and pour on the powder a great quantity of warm water; let this mixture rest a while, and when the clay has subsided, pour off
the water which swims at top; and let this washing be so often repeated, that all the most minute Lumps of the clay be broken, and whatever salt it contains perfectly washed out; then add to this fine clay, of the purest kind, of powder of calcined flints, ground, and well washed, of faulty but clean Hellenic crucibles, or of any incombustible flones ground very fine, such a quantity as will render the mass thick, and hardly adhering to the hands in kneading it, or pliant when rolled into a thin lamina.

This is the matter for making this sort of tefts; but, before any quantity of the vessels be made of this earth, it will be prudent first to finish a single one, and try it, by putting on it a quantity of glasses of lead, and exposing it for an hour or more to the strongest fire; by this trial you will be certain whether or not the mass is capable of making vessels that will resist both the fire and the glasses of lead; and by no other means but this trial is it possible to determine the due proportion of the mixture of the ingredients for this use, on account of the variety of the clays. Nature in some places affords a clay so well tempered, that it is extremely proper for the making of tefts without any preparation, or without the admixture of any other matter. Sometimes this only requires a simple washing, but commonly it is necessary to make it into balls, and powder or wash them as before directed.

On the trial of a teft made of this, or the former mixed clay, if it runs into glasses, you must add to it of the powder of flones, especially such as will resist the fire. Great care is to be taken not to add too much powdered chalk to these compositions, since if the matter is tempered with that alone, the tefts will indeed resist the fire very well, but being too porous, they will yield a passage to lardisse, which will soften them to such a degree, that they will either fall upon themselves, or be totally crumpled when taken hold of with the tongs.

The vessels are to be made in the following manner: rub over the sides and bottom of a small mortar, and also its pelfe, with oil, or with the fat of bacon; fill it two-thirds full of prepared clay, then make a flight impression with your fingers in the middle of the clay; then place the bottom of the pefle there, and force it down with blows of a hammer, the stronger the better. When thus properly hollowed, take it out of the mortard, and pare its edges, and dry it, as the coppers are dried, in the air, in a dry warm place.

Tefts thus prepared may be used as soon as dry, unless for faits or lardisse; but these bodies, when melted in vessels not first baked or hardened in the fire, always make their way through them.

Some of the German writers also recommend, both for tefts and coppels, a foot of friable opaque flone, called white flath, which appears to be a species of gypsum, or of the flones from which puffer of Paris is prepared. The pather is directied to be calcined with a gentle fire, in a covered vessel, till the flight crackles, which happens at first, has ceased, and the flone has fallen in part into powder; the whole is then reduced into subtile powder, which is passed through a fine sieve, and moistened with so much of a weak solution of green vitriol, as is sufficient for making it hold together. Gellert, however, finds, that if the flone is of the proper kind, which can be known only by trials, calcination is not necessary. These tefts are liable to soften or fall under in the fire, which inconvenience may be remedied, according to Schaffer, by mixing with the uncalcined flones somewhat less than equal its weight, as eight-ninths of such as had been already used and penetrated by the oearia of the lead, taking that part of the old teft which appears of a green-grey colour, and rejecting the red crust on the top. But from his account it appears, that these tefts are less durable than those made of the ashes of bones, though much superior to those of wood-flones. Vegetable ashes, which stand very well the testing of silver, can scarcely bear any great quantity of gold, which requires a considerably stronger fire than the other; but bone-ashes, says Dr. Lewis, answer to effectually, and are among us so easily procured, that it is unnecessary for the refiner to search for any other materials. Cranmer's Art of Ablaying, p. 60. Lewis's Com. Ph. Tech. p. 144.

Test-liquor, a term used by our dealers in brandies, &c. for a liquor which they use as a teft of brandy, &c. to prove whether they be genuine, or mixed with home spirit. The people who use this, place great confidence in it, but it is really a very vague and uncertain thing. They pretend that this liquor will flow, by the colour which it makes on its being poured into brandy, whether it be genuine or adulterated; or if not genuine, in what proportion the adulterating spirit is mixed with it.

The whole fact is this: if a little common green or white vitriol be dissolved in some fair water, it makes a teft-liquor, a few drops of which being let fall into a glass of old French brandy, will turn the whole to a purple or fine violet-colour; and by the strength or paleness of this colour, the dealers judge the brandy to be genuine or mixed in different proportions, with home spirits.

Old French brandy, having long lain in the cask, takes a dilute tincture of the wood of the cask, that is, of oak; and this being of the same nature with a solution or tincture of galls, naturally turns blueish or blackish with vitriol. A new distilled brandy, though wholly foreign, would not give this teft; and a common malt spirit, with oak chips infuded in it, will turn as dark as the finest brandy. While our distillers, indeed, had nothing in use for the colouring of their spirits but burnt sugar, it was possible to make some gues at an adulteration with them, because the brandy, in this case, would not become blackish in proportion to its former colour; the sugar colour not turning to ink with the vitriol, like the other: but our distillers have since found a way of using an extract of oak for the colouring of their spirits, and since that, this teft-liquor is of very little use, our common spirits, of any kind, turning as deep with it as the foreign brandies.

The very best way of making this teft-liquor, is with a calcined vitriol of iron, dissolved in a dilute or aqueous mineral acid. The liquor, when well made in this manner, is of a fine yellow colour, and will give, for a time, the finest blue to any spirituous tincture of oak.

The English were, at one time, very fond of high-coloured brandies, and it was then that the use of this teft-liquor was most esteemed; afterwards we, as well as other nations, finding that this colour was only owing to the cask, began to dislike, and to favour the pale brandies: at length we fell into the use of such as were wholly limpid and colourles, and the re-distilling of all the old brandies of which people were poifessed, took place; on this the teft-liquor was found to be of no use at all, and accordingly rejected; but as we are of late again come into the efeem of coloured brandies, and that with great justice, as the colour, when genuine, is a certain mark of the age of the liquor, this teft-liquor is again got into more credit than it deserves.

The famous Helvetian apothecary depended wholly on this accident for its colour; and it was no small mortification to our chemists, when, some years ago, it was introduced into use among us, that they could not make it with our own spirits, but must be at the expence of true French brandy.
brandy for it; our own spirits, though equally coloured, would never make that violet tincture, because their colour was owing to burnt sugar, not a tincture of oak. At length this mystery was explained, and a little scraping of galls made all those quantities of this flyptic, which had been set by as good for nothing, perfectly fine and well-coloured. Shaw's Essay on Distillery.

**Test-Act.**

In *Law,* is the statute 25 Car. II. cap. 2 (1673) which directs all officers, civil and military, to take the oaths, and make the declaration against transubstantiation, in the court of king's bench or chancery, the next term, or at the next quarter sessions, or (by subsequent statutes) within six months after their admission; and also within the same time to receive the sacrament of the Lord's supper, according to the usage of the church of England, in some public church, immediately after divine service or sermon, and to deliver into court a certificate thereof, signed by the minister and churchwarden, and also to prove the same by two credible witnesses, upon forfeiture of 500l. and disability to hold the same office. Besides this penalty, if, without taking the sacramental qualification within the time prescribed by the act, a person continues to occupy a civil office, or to hold a military commission, and is lawfully convicted, then he is disabled from thenceforth, for ever, from bringing any action in course of law, from prosecuting any suit in any court of equity, from being guardian of any child, or executor or administrator of any person, as well as from receiving any legacy. For an account of the nature and operation of the *Corporation Act,* we refer to that article.

The word *test* signifies *proof or trial,* being formed of *leif,* *witnes;* this act being established with a view to exclude Roman Catholics from any share in the government, though it has operated to the exclusion of Protestant dissenters in general. The *Corporation Act,* enacted in the year 1661, the 13th of Charles II., was principally, but not wholly, designed against Protestant non-conformists. It was passed in a period of great heat and violence, the year after the Restoration; and it paved the way for the act of uniformity, which soon after passed. The king, with his ministers, and the majority in both houses, hated the Presbyterians, whom they considered, whether justly or not, as the authors of the late rebellion. Great power still remained in their hands, for, during the Protectorate, they had been appointed magistrates in all the country towns. To leave authority in such hands seemed dangerous; it was therefore judged expedient to regulate the corporations, and to expel those magistrates, whose principles were inimical to the constitution, civil and ecclesiastical. This gave rise to the Corporation act. The sacramental clause, however, in the Corporation act was intended against the Catholics; for, as the other provisions of the statute, by dispossessing the enemies of the court, had established the influence of the crown in all the corporations of the kingdom, the parliament was apprehensive that in the next reign, under a Catholic king, all corporate offices would be filled with Catholics. Besides, before the passing of the act of uniformity, those that were afterwards called dissenters, were within the inclosure of the church, and consequently participated in her sacraments, so that the sacramental clause must therefore have been intended as a guard against the Catholics, to whom it effectually applied, and not as a guard against those who were afterwards called dissenters, on whom, at that period, it could not operate.

It must also be allowed, that the original design of the test was not so much to exclude the Protestant dissenters, as the papists, as the Catholics were then called. It was brought in by the patriots, in the reign of Charles II., under their apprehension of popery, and a papist successor; and when, during the debate in the house of commons, it was observed, that it was drawn in such a manner as to comprehend the Protestant dissenters, the court greatly endeavoured to avail themselves of that circumstance in order to defeat the bill. But the dissenting members disappointed them, by declaring, that they had rather confide in the justice and generosity of parliament, to pass some future bill in their favour, than be the occasion of retarding or defeating the security, which the present bill was calculated to afford to the liberties of their country. Their patriotism produced, soon afterwards, a bill for their relief from the penal laws; but the parliament was prorogued, through the refinement of the court, to prevent its passing: and when, notwithstanding this, a bill in favour of the dissenters did afterwards pass both houses, viz. in the year 1680, and lay ready for the royal assent, the court ventured upon a very extraordinary expedient; the clerk of the crown was ordered to convey away the bill, and, accordingly, it was never afterwards to be found. The particular test of refusing the sacrament according to the rites of the church of England, was calculated to exclude the papists rather than the Protestant dissenters; as it was no uncommon thing for the latter, at that time, to receive the sacrament occasionally in the church of England, in order to express their charity towards it, as a part of the church of Christ. If it had been the design of the legislature to exclude all from civil offices but those who have a real affection for the constitution and worship of the church, it is apprehended they would have appointed the test to be, not merely once taking the sacrament at church, but a stated and constant conformity to its religious services.

It has been alleged, however, that though the Test act was designed against the Catholics, yet that few, even then, of the number, merited a treatment so severe. They, it is said by their advocates, had no concern in the views of Charles or his brother, in the schemes of wild ministers, or in the machinations of bad politicians. They had suffered much in the royal cause, and were pinning in penury and distress, under the additional pressure of cruel laws. But whatever might be the reasons, real or pretended, for passing an act, of which Catholics were the principal objects of obloquy, the case is now very much altered, and Catholics have assumed a new character, which entitles them, in the judgment of many, not merely to protection, but to a participation of the privileges of their fellow-subjects.

As the question concerning the repeal of the disqualifying laws which we have already mentioned, has been, and is likely soon again to become a subject of public discussion, and as it is a subject, generally considered, of great importance and interest, it may not be thought improper to state the arguments for and against the repeal of those excluding statutes, comprehending both Protestant dissenters and Catholics, in as concise a manner as possible. The general principles upon which the equitable decision of this question depends, are such as follow:—Every man has an undoubted right to judge for himself in matters of religion; nor should any mark of infamy, or any civil penalty, be attached to the exercise of this right:—Every man has a right to the common privileges of the society in which he lives; and among these common privileges, a capacity of law for serving his sovereign and country is one of the most valuable, distinguishing a legal capacity of service, from a right to an actual appointment, which depends upon the choice of his sovereign, or of his fellow citizens; and this capacity of serving the state is a right of such high estimation, and of such transcendent value, that exclusion from it
is deemed a proper punishment for some of the greatest crimes:—Actions, and not opinions, political or religious, are the proper objects of human authority and cognizance:—No man, who does not forfeit that capacity of serving his sovereign and country, which is his natural right, as well as the honour and emoluments that may happen to be connected with it, by overt-acts, ought to be deprived of them; and disabilities that are not thus incurred are unjust penalties, implying both disgrace and privation:—Punishment, without the previous proof of guilt, cannot be denied to be an injury; and injuries inflicted on account of religion are undoubtedly perfections:—The ends of civil society can never justify any abridgment of natural rights that is not essential to those ends:—The institutions of religion, and the ordinances of civil government, are distinct in their origin and their objects, in the functions that enforce them, and the mode in which they are administered:—The institution of the Lord's supper, being wholly of a religious nature, and appointed merely as a memorial of his death, is improperly applied to the secular ends of civil society; and if it be so applied, it is not only an improper, but in many cases an insufficient, test of the principles and character of those to whom it is administered. Such are some of the leading principles, which have been the subjects of discussion in the debates that have occurred, both among writers and among our legislators, in considering the expediency of repealing the Test laws. The case of the Catholics and of the Protestant dissenters has been repeatedly argued in both houses of parliament, and may probably again become the subject of public discussion. Many (indeed most) of the same arguments apply to both descriptions of persons; but we shall chiefly restrict ourselves to the pleas of the dissenters. They have urged, that being well-affected to his majesty and the established government, and ready to take the oaths required by law, and to give the fullest proof of their loyalty, they think their sincere desire to receive the sacrament after the manner of the church of England, or after the manner of any church, as a qualification for an office, ought not to render them incapable of holding public employments, civil or military; they also allege, that the occasional receiving of the Lord's supper as a qualification for a place, cannot, in the nature of things, imply that those who thus receive it, mean to declare their full and entire approbation of the whole constitution and frame of the established church; some men may be compelled by their necessities, or under the allurement of specious advantages, to do what they would not do, if they were left to their free choice. Others, perhaps, may comply with the sacramental test who are not even Christians, and who therefore cannot be suppos'd to wish well to Christianness itself, or to any national establishment of it whatsoever. Hence they are led to think, that such a test can be no real or effectual security to the church of England. Conceiving that they have a right, as men, to think for themselves in matters of religion, and that this right is preserved and functioned by the Author of Christianity; and that they have a right, as citizens, to a common chance with their fellow-subjects for offices of civil and military trust, if their sovereign or fellow-citizens should think them worthy of confidence; they cannot be of opinion that any of the ends or objects of civil society require that these rights should be superceded, and that they should be excluded from the service of the state. Their advocates plead on their behalf, that the continuance of these acts which invade their rights is so far from being necessary to the well-being of the state, or to the establishment of the national church, that they are actually pernicious both to the state and church, and ought to be repealed. Their utility is shewn by referring to the higher trust of legislative authority, to which the dissenters are admitted without hesitation or reserve, and without submitting to any such test. An excitable fury, it is said, does not sustain a more important office, neither is it necessary that he should make a profession of his Christian faith more than a member of the house of commons or the house of peers. The principles of the dissenters, their attachment to the constitution, and their zeal in support of it, have been sufficiently manifested in a variety of instances, from the Revolution to the present day; and yet can it be alleged, that their exclusion from the service of the public is necessary or beneficial to the state? Can it be said that the continuance of the disabilities to which their profession subjects them, is necessary for the safety or honour of the church? The establishment of a church requires a legal provision for its ministers; but it does not require for its safety an exclusive right to civil and military trusts. The establishment of the church of England conflicts in her titles, her prebendaries, her canons, her archdeacons, her deaneries, and her bishoprics. These constituted her establishment before the Corporation and Test acts had any existence; and they will equally constitute her establishment if these acts should be repealed. In Scotland they have had no such acts; and yet Scotland has an established church. In Ireland these acts have been repealed; and yet the established church of Ireland remains. In Holland, Ruffia, Prussia, Germany, &c. they have no such acts. As to the intimate and beneficial connection between church and state, on which some have grounded the supposed propriety and necessity of these laws, it would be sufficient to refer to the authority of archdeacon Paley, who has stated what ought to be the single end of church establishments. (See Religion.) Upon an appeal to history, it has been argued that the civil government maintained itself in former times, when unconnected with the church; and the disturbances which terminated in the ruin of both church and state, are laid to have originated in the intolerant spirit and arbitrary proceedings of some ecclesiastics, who had themselves exercised powers, and had intimated their unhappy sovereign to actions and claims at least as contrary to, and subverfive of, the true spirit of the constitution, as any of those violence of the times immediately succeeding, which have been so justly reproved. In this connection, we may refer to the speech of an able advocate for the repeal of the disabling statutes: who maintains that no human government has a right to inquire into men's private opinions, to prefix that it knows them, or to act on that presumption. Men should be tried by their actions, not by their opinions. This, if true with respect to political, was more peculiarly so with regard to religious opinions. In the position, said Mr. Fox, that the actions of men, and not their opinions, were the proper objects of legislation, he was supported by the general tenor of the laws of the land. History, however, afforded one glaring exception in the case of the Roman Catholics. The Roman Catholics, or rather the Papists, as they were then properly denominated, had been suppos'd by our ancestors to entertain opinions that might lead to mischief in the state. But it was not their religious opinions that were feared. Their acknowledging a foreign authority paramount to that of the legislature; their acknowledging a title to the crown superior to that conferred by the voice of the people; their political opinions, which they were suppos'd to attach to their religious creed, were dreaded, and justly dreaded, as inimical to the constitution. Laws therefore were enacted to guard against the pernicious tendency of their political, not of their religious, opinions; and the principle thus adopted, if not founded on justice,
was at least followed up with constancy. Their influence in the state was feared, and they were not only restrained from holding offices of power or trust, but rendered incapable of purchasing lands, or acquiring influence of any kind. But if the Roman Catholics of those times were Papists in the strictest sense of the word, and not the Roman Catholics of the present day, still he would say, that the legislature ought not to have acted against them, till they put in practice some of the dangerous doctrines which they were thought to entertain. Difability and punishment ought to have followed, not to have anticipated, offence. Those who attempted to justify the disabilities imposed on the dissenters, must contend, if they argued fairly on their own ground, not that their religious opinions were inimical to the established church, but that their political opinions were inimical to the constitution. If they failed to prove this, to deprive the dissenters of any civil or political advantage, was a manifest injustice; for it was not sufficient to say to any set of men, we apprehend certain dangers from your opinions, we have wisely provided a remedy against them, and you, who feel yourselves aggrieved, calumniated, and proscribed, by this remedy, must prove that our apprehensions are ill-founded. The aures probandi lay on the other side; for whoever demanded that any other person should be laid under a restriction, it was incumbent on him first to prove that the restriction was necessary to his safety, by some overt act, and that the danger he apprehended was not imaginary but real. Was it seriously to be contended, that religion depends upon political opinions; that it can subsist only under this or that form of government? It was an irreverend and impious opinion to maintain, that the church must depend for support, on its being an engine, or ally, of the state, and not on the evidence of its doctrines, to be found by searching the scriptures, and the moral effects it produced on the minds of those whom it was its duty to instruct. See Toleration.

Mr. Pitt agreed with Mr. Fox in admitting, as a general principle, that the religious opinions of any set of men were not to be restrained or limited, unless they be found likely to prove the source of inconvenience to the state; nor ought the civil magistrate, in any other point of view, to interfere with them; but he maintained, that when religious opinions are such as may produce a civil inconvenience, the government has a right to guard against the probability of the civil inconvenience being produced; nor ought they to wait till, by being carried into action, the inconvenience has actually arisen. It was not therefore on the ground that the dissenters would do any thing to affect the civil government of the country, that they had been excluded from civil offices, but that if they had any additional degree of power in their hands, they might. On the other hand, it has been pleaded, that to restrain men's civil rights from the supposed tendency of their opinions, is a very dangerous principle, as it must render their condition precarious and wholly dependent on the prejudices and will of the magistrate, and warranted unlimited restraint, and almost every species of perpetuation.

Mr. Pitt, premising that the establishment of a settled form of church and of its ministers is necessary to the civil government of the country, fuggles the impropriety of distributing the emoluments and offices of the established church among persons who, however respectable their character, might be, were not members of the same communion; but others say, that the emoluments and offices of the established church are not the objects intended for, but those of the state, unless the church and state be absolutely identified. He also says, that these offices may be considered as matter of favour, because it is conform with the government of this country, that all offices should be given at its direction; and here, he says, from the delicate nature of the case, the legislature had thought proper to interpose, and to restrain the Supreme magistrate, the head of the executive authority, and limit him in his appointment to those offices; but surely, as he contends, this differed essentially from any degradation, disgrace, or punishment of the dissenters. Others, however, have considered this kind of reaoning as fallacious, both in its principle, and in the inference deduced from it.

Mr. Fox concurred with lord North, who, though an advocate for the continuance of these disqualifying laws, bore testimony to the principles and character of the dissenters, in his avowal of their steady attachment to government; and he added, that their religious opinions were favourable to civil liberty, and that the true principles of the constitution had been remembered and affirmed by them, at times when they were forgotten, perhaps betrayed, by the church. See Dissenters.

Mr. Fox maintained, that the Teft act was altogether inadequate to the end it had in view. The purport of it was, to protect the established church, by excluding from office every man who did not profess himself well affected to that church. But a professed enemy to the hierarchy might go to the communion table, and afterwards say, that in complying with a form, enjoined by law, he had not changed his opinion, nor, as he conceived, incurred any religious obligation whatever. There were many men, not of the established church, to whose services their country had a claim. Ought any such man to be examined, before he came into office, touching his private opinions? Was it not sufficient that he did his duty as a good citizen? Might he not say, without incurring any disability, "I am not a friend to the church of England, but I am a friend to the constitution, and on religious subjects must be permitted to think and act as I please." Ought their country to be deprived of the benefit she might derive from the talents of such men, and his majesty prevented from dispensing the favours of the crown, except to one description of his subjects? But whom did the tell exclude, the irreligious man, the man of profuse principles, or the man of no principle at all? Quite the contrary; to such men the road to power was open; the tell excluded only the man of tender conscience; the man who thought religion to distinguish him from all temporal affairs, that he held it improper to profess any religious opinion whatever, for the sake of a civil office. Was a tender conscience inconsistent with the character of an honest man? or did a high sense of religion shew that he was unfit to be trusted? Allowing that the established church ought to be protected, it was natural to inquire what was the established church? Was the church of England the established church of Great Britain? Certainly not; it was only the established church of a part of it; for, in Scotland, the kirk was as much established by law as the church was in England. The religion of the kirk was wisely secured, as the established religion of Scotland, by the articles of Union; and it was folly absurd to say, that a member of the kirk of Scotland, accepting an office under government, not for the service of England exclusively, but for the service of the united kingdom, should be obliged to conform, not to the religious establishment of Scotland, in which he had been bred, but to the religious establishment of England.

To the argument urged in favour of the Corporation and Teft acts, founded on the apprehension that if they were repealed, the dissenters might become a majority of the people, Mr. Fox gives a brief reply, viz. that if the majority of the people of England should ever be for the abolition of the established church, then it ought to be abolished. It has been said, that by manifesting indulgence to other sects, a candid
a candid respect for their opinions, and a desire to promote mutual charity and good-will, the established church will be most likely to secure its stability and its honour. Whilist the grievances of persons of a different profession are redressed, and they are admitted to a participation of their civil rights, the church need not fear any combination for fapping its foundation, or for depriving it of its peculiar and distinguishing honours or emoluments. Men who are aggrieved, under a sense of what they conceive to be an indignity and injury, are the most likely to manifest hostility against an ecclesiastical establishment that engrosses all civil and secular advantages to itself.

It has been said, that it would conduct to the honour of the rulers and dignitaries of the church, if they would concur in abolishing laws which perpetuate the perversion and profanation of a religious institution;—an institution which certainly was not intended by its divine founder for the attainment and promotion of any selfish and secular purposes. Here, it is maintained, if any where, a line of separation should be drawn between religious and civil policy; nor should the performance of a Christian duty be made an indubitable qualification for a secular office. The diffenters, says a well-informed member of the legislature (Mr. W. Smith), who, being himself one of them, is thoroughly acquainted with their principles and character, would equally object to receiving the sacrament as a test in their own places of worship, though many of them would not scruple to partake of it with their brethren of the establishment, and according to their form, when considered only in its true light, as a religious duty, and an expression of Christian charity. The writer of this article is acquainted with several conscientious and avowed members of the established church, who lament this abuse of a Christian ordinance, and who wish, for the purity and honour of the church to which they are attached, that the laws imposing this test were repealed. It would likewise contribute to the satisfaction of scrupulous ministers of the established church, to be released from the obligation of administering the sacrament, as a qualification for office abstractedly considered, and more especially to persons of known licentiousness of principles and conduct. By the duties of his function, by the positive precepts of his religion, and by the rubric or canons of the church, the minister is enjoined to warn from the sacred table all blasphemers of God, all flanders of his word, all adulators, and all persons of a profane life; and yet to these very persons, if they demand it as a qualification, he is compelled, by the Test act, to administer the sacrament; and if he refuses, a ruinous prosecution for damages is the obvious and inevitable consequence. On the other hand it has been said, that if the minister’s conviction of profanery of conduct be supported by all the circumstances which constitute legal proof, he may lawfully refuse the sacrament. The truth of this opinion is doubtful; but it is certain, that if he should fail in that proof, his ruin is inevitable; and if he should succeed, it is almost equally certain; for the expenses of his suit will devour his scanty means, and probably confine him to a prison for his life. Allowing that any notorious evil-doer, offering himself to receive the sacrament, might be rejected by the minister, without becoming liable to any punishment, let it be considered what is the situation in which A or B, or the person who upon application to a minister had been refused the sacrament, was placed: from that moment he had incurred the penalties of the act, and was punished in a manner perfectly new, unexamined, and unauthorized by the laws of the land; he was convicted without a trial by jury, and was disabled from enjoying an office which his majesty, in the legal exercise of his prerogative, had thought proper to confer on him; and a person was thereby absolutely put into the hands of the clergy, who were to be the great arbiters of qualification or disqualification for offices, and places of power and emolument. Some have attempted to justify the legal establishment of the profession of a religious institution, by comparing it with those provisions of our law which enjoin the function of an oath; but this argument has been considered as inapplicable to the present case, and altogether unavailing; for though it be indeed true that the legislature, by compelling every petty officer of the revenue, and every collector of a turnpike toll, to swear deeply on his admission into office, has made the crime of perjury more common, at this time, in England, than it ever appears to have been in any other age or country; yet how does the frequent commission of this crime against law, justify the establishment of a religious profession by law? But, without any comment on the folly of pleading for a legislative desecration of religion in one way, by viewing that the legislature has contributed to its desecration in another, let it be asked, what resemblance the sacrament of the Lord’s supper, which is merely a religious institution, bears to the ceremony of an oath, which is an institution so entirely political, that it answers none of the purposes of religion, promotes none of her interests, forms no part of her establishment, and belongs as much to the Jew, the Mahometan, and the idolater, as it does to the Christian. The difference, says Mr. W. Smith, between the sacrament, used as a test for office, and an oath, as a test of truth, is too obvious to escape the most careless observer. An oath was neither primarily, nor at all, an act of worship; nor, though it necessarily supposes a belief in a supreme moral governor, was it ever used as a test of particular religious opinions: the sole object to which it was directed was the attainment of truth, (with respect either to the past or the future,) where other means were insufficient, —an appeal to a Being who, by the supposition, must be acquainted with all the circumstances, and must also be both able and inclined to punish falsehood in such cases, as an infirmt added to a crime, was perfectly well calculated to attain the proposed end, and inapplicable to any other purpose.

If, says Mr. Fox, in concurrence with some previous observations of Mr. Beaufroy, when a man is seen going to take the sacrament, it should be asked, “is this man going to make his peace with God, and to repent him of his sins?” the answer should be, “No; he is only going there, because he has lately received the appointment of first lord of the treasury;” can any circumstance afford a greater proof of the indecency resulting from the practice of so qualifying?

Some have contended, that to grant a remission in favour of Scotland of the Test and Corporation acts, would be a breach of the union; an opinion which supposes, that because, by the articles of union, nothing can be taken from Scotland but what was then stipulated, therefore nothing can be given. Others say, that as the Test and Corporation acts are among the statutes which secure the doctrines, discipline, worship, and government of the established church of England, they are therefore by the act of union declared to be unalterable. In reply to this mode of arguing it has been observed, that the government and discipline, the doctrines and the worship of the English church, were the same before the statutes were enacted, and would continue the same if those statutes were repealed; and consequently do not derive their security from them: whereas the act which relates to the patronage of the church of Scotland, and which did seem to affect its discipline, was held to be no breach of the articles of union; neither was that union understood to be weakened by the subjacent act, which gave a complete toleration in Scotland to episcopal dissenters.

When the articles of union were under the consideration of parliament, a proposal was made in the house of lords, that
that the perpetual continuance of the Telf act; and in the house of commons, that the perpetual continuance of the Corporation act, should be declared a fundamental condition of the intended union; but the motions were both rejected; a proof that the legislation did not mean to give to them the same perpetual existence as to the act of uniformity, and to the statute that was passed in the thirteenth of Elizabeth, both of which were specifically named, as conditions of the compact, and expressly declared irrevocable.

If the Telf and Corporation laws are deemed unalterable parts of the articles of union, it follows, of course, that every alteration in those laws must be deemed a breach of the union, and that every suspension of those laws must be considered as a suspension of the union. Now both these acts are altered, and in part repealed, by subsequent statutes, and for six months in almost every year are wholly suspended. But who will assert that the articles of union are disproved, or that their obligation on the two countries is suspended for six months in every year? or who will deny that the same power which alters a part may alter the whole of those laws? Who will deny that the same authority which suspends a law for six months, may abolish it for ever?

In favour of the continuance of these laws it has been adduced, that they have existed for many years with great advantage; but many attempts have been made to disprove the advantage of them, and they have repeatedly been complained of as both useless and unjust. Besides, this argument for their existence is absurd, as it tends to perpetuate every enormity that can plead the fansion of age. The horror of innovation may be felt or feigned as a bar to every improvement. It may be nevertheless asked, how have these laws subsisted? By repeated suspensions; for the indemnity bills are, with few exceptions, annual acts; and where would be the propriety of suspending them for ever, by an act of perpetual operation. In order to fince complaints of these partial and injurious laws, it has been said that the act of indemnity, annually passed, protects from the penalties of the Telf and Corporation laws all such persons as have offended against them. If it afford such protection, what inconvenience can arise from a repeal of the statutes themselves? Is not the constant and invariable practice of pausing such a bill annually, a tacit acknowledgment that the Telf acts are improper or unnecessary; that the penalties, if incurred, ought not to be enforced; and therefore no man could be blamed for resorting to an indemnity, held out as a protection against punishments inflicted by laws which the legislature itself continually treated with a kind of disrespect, and which were already almost repealed in practice, though they were still preferred in the statute-book by a species of superfluous regard? The only justification for evading a statute, that can be for a moment maintained, is, when that statute notoriously ought not to remain in force; and when to evade it, on account of its nature and tendency, is meritorious. But it has been said, that the Indemnity act does not protect the dissenters from the Telf and Corporation laws; for its only effect is, that of allowing farther time to those trespassers on the law, against whom final judgment has not been awarded. Should, for example, a prosecution have been commenced, but not concluded, the Indemnity act does not discharge the proceedings; it merely suspends them for six months; so that if the party accused does not take the sacrament before the six months allowed by the Indemnity act shall expire, the proceedings will go on, and, long before the next indemnity act will come to his relief, final judgment will be awarded against him. Thus it appears, that the Indemnity act gives no efficacal protection to the dissenters, who accepts a civil office or military command; for he who cannot take the sacrament at all, cannot take it within the time required by that act. After all, indemnity supersedes crimination, and an obnoxiousness to punishment: the office and penalty are created by these statutes: repeal the laws, and indemnity becomes needless. No man would wish, if it were always practicable, to shelter himself under an act of indemnity for omitting to do what, independently of these laws, he ought not to do; or chuse to have it thought that he is left fit and able to serve his king and country than his neighbour, who does not feel the restraint of his conscientious scruples. In corporate towns and many public offices, the obligation to qualify is considered as a kind of dead letter, and an inforner would be very generally thought an odious character.

As to the Corporation act, it is said to have been forced from the legislature as an act of self-defence; and this is the proper description of an act, which, after the lapse of much more than a century, when the grounds and reasons for pausing it no longer existed, ought to be repealed. The question that forms the subject of this article is, in our opinion, intimately connected with the honour of the church and the prosperity of the state, as well as with the general interests of religion and liberty; and with these views of importance, we refer the decision of it to the impartial judgment of the reader.

TESSO, in Geography, a river of England, which rises in the north-west part of Hampshire, borders on Wiltshire, and runs into Southampton Water. Sir Henry Englefield seems inclined to think the original name was Amt.

TESTA, in Antiquity, the fame with ofricaon. See Os-

TRACISM.

TESTA, in Italian Singing. When a performer sings through the nose, the throat, or the teeth, the voice is called voce di tefo, to distinguish it from voce di peto. Tosti says: "let the matter attend with great care to the voice of his scholar, which, whether it be di peto, or di tefo, should always come forth neat and clear, without pausing through the nose, or being cloaked in the throat; which are two of the most horrible defects in a singer, and pass all remedy if once grown into a habit." Galliard's Transl. of Tofi on florid Song.

TESTA, Pietro, in Biography, called Il Lucchesino, from having been born at Lucca. His birth took place in 1611, and he was first instructed in painting by Pietro Paolini; afterwards he studied at Rome, under Domenichino and Pietro da Cortona. The principal objects of his study were antique marbles, and the remains of ancient architecture; in which employment such was his affinitie, that few vestiges of antiquity were known which had escaped his pencil. His extreme poverty made him morose and melancholy; and he made himself many enemies, by the freedom with which he spoke of the productions of other painters. From this state of trouble he was relieved by Sandrart, who found him among the ruins, and compassionating his distress, took him to his house, where he clothed and entertained him, and introduced him to the prince Jullianisi, who employed him. After this he succeeded; and the great freedom and ease of his pencil procured him many patrons. Several of the churches and palaces at Rome are adorned with his productions: the bell are esteemed to be those of the Dead of St. Angelo, in the church of St. Martino a Monti, and of the Dead of Iphigenia, in the Palazzo Spada. His works, however, are more frequently to be met with at Lucca. As a designer, Pietro Telfa was unequal; he frequently tackled to antique toros ignoble heads, and extremities copied from vulgar models. Of female beauty he appears to have been igno-
compliance may
in the
feas, but also to those of the rivers and lands; and it has moreover an evident claim to priority, having been in use for at least the last forty years among the best English authors. Da Costa, a writer of no ordinary information, indeed appears to have assumed to himself the establishment, if not the actual invention of the term; for in his "Elements of Conchology," published in 1776, he expressly observes, "this peculiar branch of the history of nature, I shall call conchology." Many authors call it conchophytole; and this we find to be true in compliance both with the French and the Latin, the "Conchophytole" of D'Argeville, and "Histologia Conchologica" of Liller, two works of great celebrity, that had appeared some time before his "Elements" were published. We have thus endeavoured to prove that the terms telfactology and conchology are purely synonymous; and if any doubt remained, we might finally quote one further passage from the Elements before alluded to, in which we are distinctly told, that "the term of Conchology, applied to this branch of natural history by all authors, is quite applicable to its arrangement by the shells, and not by the fifth." As we have already endeavoured to exemplify the rise, progress, and present state of the science of telfactaceous bodies in a very ample manner under the article Conchology, and may be allowed to presume, with some little confidence, that we have therein concentrated much useful information upon this truly pleasing and very favourite science, it might be esteemed a waste of words to enter into any very considerable digression upon the same subject again; we shall therefore merely recommend a careful perusal of that article to the attention of the reader, and trust the result will be considered satisfactory.

It was indeed our wish, and we had made some general promise to that effect, that under the present article we would resume this subject, and submit the outlines of what we were induced to think an improvement upon the present prevailing arrangement; and upon this point it is now incumbent to offer a few remarks.

The most ardent admirer of the great Linnaeus will readily concede to us, that the science of conchology was not one of those within the province of his deep research, or the decided contemplation of his active mind. Its introduction as a science, was necessary to complete the series of the vital chain of animated nature, the classification of which he had undertaken in his "Systema Naturae," and it was therefore one he could not omit. But for this, it is believed, and with tolerable certainty, that he would have willingly avoided the subject altogether in the latter editions of that work, as it was in the early ones. We have already shewn under our article Conchology, the actual state in which Linnaeus found the science, as handed down to him by his predecessors; and the various purposes to which he applied their labours and affinities. From a general view of the whole, there can no doubt remain that there is yet much to amend in the classification of shells, and that the subdivision of many of the genera already established into natural genera, appears desirable. It was under this persuasion that we had
had intended, when writing the article Testaceology, to have submitted our ideas as to a new and more comprehensive classification of the genera; to have pointed out the very essential distinctions that exist in shells of the same Linnean genera; and have thence endeavored to deduce an arrangement congenial with the characters of the respective natural genera which his artificial genera present. This we believe would have been regarded as an improvement in the classical distribution of the shell-tribe, but such an illustration does not appear, upon more mature reflection, to be admissible here. It must be apparent that no words, unaccompanied by figures, could possibly convey to the reader any adequate conception of the minute, ambitious, and intricate essential characters, which many among the various tribes of shells present; and that such a series of plates as it would demand to illustrate a subject so very copious and diffuse, however desirable in the opinion of the naturalist, could not be appropriated, with any degree of propriety, in addition to the very costly series of plates already devoted by the Cyclopædia to this science in particular.

The series of plates which have already appeared, elucidate the whole of the Linnean genera, and under each of those genera, a number of the more striking natural genera which appertain to them respectively. These plates are numerous, and the subjects for them have been selected with every possible attention; nor can we hesitate to think upon the whole they will be considered, without any further addition, as amply sufficient for every useful purpose of general information.

**TESTACEOUS, in Natural History, an epithet given to those shells, which are covered with a strong, thick shell; as oysters, pearl-fish, &c.**

In limestones, however, tellaceous is only applied to shells whole strong and thick shells are entire; those which are soft, thin, and consist of several pieces joined, as the lobster, &c., being called **crystalline.**

In medicine, all preparations of shells, and substances of the like kind, are called **tellaceous.**—Such are powders of crab’s claws and eyes, pearl, &c.

Dr. Quincy, and others, suppose the virtue of all tellaceous medicines to be alike; that they seldom enter the lacheta, but that the chief of their action is in the first passages; in which however they are of great use in affording acidities.

Hence they become of use in fevers, and especially in rectifying the many distempers in children, which generally owe their origin to such acidities.

**TESTAMENTUM, in Law, a solemn and authentic act, by which a person declares his will, as to the dispoofal of his estate, effects, burial, &c.**

Testaments, according to Julinian, and Sir Edward Coke, are so called, because they are **testato mentis;** an etymon, says judge Blackstone, which seems to favour too much of the consent, it being plainly a substantiative derived from the verb **testari.** The definition of the old Roman lawyers is much better than their etymology; **voluntas nostra justa sententia de eo, quod quis post mortem suam fieri velit,** i.e., the legal declaration of a man’s intentions, which he wills to be performed after his death. It is called **sententia,** to denote the circumspicion and prudence with which it is supposed to be made; it is **voluntas nostra justa sententia,** because its efficacy depends on its declaring the testator’s intention, whence in England it is emphatically styled his will: it is **justa sententia,** that is, drawn, attested, and published with all due solemnities and forms of law; it is **de eo, quod quis post mortem suam fieri velit,** because a testament is of no force till after the death of the testator.

Blackstone’s Comm. vol. ii.

A testament has no effect till after death, and is always revocable till then. As testaments are acts, of all others, the most subject to deceits, surprizes, &c., it was found necessary to use all kinds of precautions to prevent the wills of deceased from being clauded, and the weakens of dying persons from being abused. See Will.

The most ancient testaments among the Romans were made **viae voce,** the testator declaring his will in the presence of seven witnesses; these they called **nuncupatoria** testaments; but the danger of trusting the will of the dead to the memory of the living soon abolished these: and all testaments were ordered to be in writing.

The French legislators thought **holographic** testaments, i.e., testaments written wholly with the testator’s hand, an abundant security; but the Roman law, more severe, did not admit of testaments without further solemnity.

The easiest, and most favourable, is the twenty-first law in the **code de testaments,** which permits such as are unwilling to trust the secret of their testaments to others, to write it with their own hand, and to close it in the presence of seven witnesses, declaring to them, that it is their testament; after which it is to be signed by all the seven witnesses.

Otherwise, to make a solemn testament, it was required to be attested by seven witnesses, and sealed with their seals.

Yet the military testament was not subject to so many formalities: the soldier was supposed too much employed in defending the laws, to be subject to the trouble of knowing them. His mutiny, or profession excused him from observing all the rules. See Military.

Testaments, wherein fathers disposed of their effects among their children, had particular privileges, and were dispensed from most of the ordinary formalities.

**TESTAMENT, **Probae of a. See **PROBATE and Wills.**

**Testament, Old and New, in Sacred History.** The most common and general division of the canonical books of scripture, is that of the Old and New Testament. (See Cason.) The Hebrew word **Berith,** from which it is translated, properly signifies “Covenant.” Accordingly St. Paul (2 Cor. iii. 6—18.), when he is showing the superior excellence of the gospel covenant, or the dispensation by Christ above the legal covenant, or the dispensation by Moses, uses the word testament, not only for the covenant itself, but likewise for the books in which it is contained. The Hebrew term **Philadelphia, berith,** invariably rendered covenant by our translators in the Old Testament, is uniformly translated **Δαιμονίας** in the Septuagint; and in the writings of the apostles and evangelists, the words **καθάρισμα, δαιμονίας,** are almost always rendered by our translators the New Testament. It is observed, that the Hebrew term corresponds much better to the English word “Covenant,” though not in every case perfectly equivalent, than to “Testament,” and yet the word **δαιμονίας, in classical use, is more frequently rendered Testament.** Our translators, ancient and modern, have probably been led to render it Testament, by the manner in which the author of the epistle to the Hebrews argues (ch. ix. 16, 17.), in allusion to the classical acceptation of the term. The term **Nechal** is added to distinguish the religious institution of Jesus Christ from the **Old Covenant,** that is, the dispensation of Moses. Accordingly the two covenants are always in scripture the two dispensations, or religious institutions, that under Moses is the **Old,** and that under the Messiah is the **New.** Hence, from distinguishing the two religious dispensations, they came soon to denote the books in which what related to the several dispensations was contained; the several writings of the
Jews being called εβραζον διαβλεπειν, and the writings super-added by the apostles and evangelists, εκ των διαβλεπων. The New Testament consisted very anciently of two codes or collections, called gospels and epistles. This was the case in the time of Ignatius, and also in the time of Tertullian, who distinguishes the gospels by the names of the writers, and calls them our "Digesta," or digests, in allusion, as it seems, to some collection of the Roman laws digested into order. As to the order of the several gospels, it appears, that in Tertullian's time they were dispersed, at least in the African churches, according to the quality of the writers: those two occurring first which were written by apostles, and then the other two written by apotollycal men. In some of the most ancient MSS. now extant, the order of the several evangelists is thus: Matthew, John, Luke, Mark. The order of the four gospels has been generally this: Matthew, Mark, Luke, John; then follow the Acts, St. Paul's epistles, the Catholic epistles, and the Revelation. It sufficiently appears, from a variety of considerations suggested by the excellent Dr. Lardner, that the books of the New Testament, consisting of a collection of sacred writings, in two parts, one called Gospel or Gospels, or Evangelion; the other Epistles, or Apostle or Apostles, or Apostoliccon, were only known, read, and made use of by Christians. (See Canon.) It has been a subject of some dispute, whether any sacred books of the New Testament have been lost; but there are many considerations, tending to satisfy us, that no sacred writings of the apostles of Christ are lost.

The four gospels, in our possession, were written for the benefit of those who would undoubtedly receive them with respect, keep them with care, and recommend them to others; and if any other such authentic histories of Jesus Christ had been written by apostles, or apotollycal men, they would have been received, and preferred in like manner. The book of the Acts, which we still have, was the only authentic history of the preaching of the apostles after our Lord's ascension, which they had in their hands, or had heard of; consequently there was no other such history to be lost. The epistles of Paul, James, Peter, John, Jude, were sent to churches, people, or particular persons, who would shew them great regard when received, would carefully preserve them, and readily communicate them to others, that they might take copies of them, and use them for their establishment in religion and virtue; and if other such epistles had been written, the cause would have been much the same, nor could any of them have been easily lost. Besides, the apostles and evangelists, who drew up any writings for the instruction or confirmation of Christian people, must have been careful of them. Upon the whole, we have no sufficient reasons for believing, that any sacred writings of the New Testament have been lost. All the books of the New Testament were written in Greek, except the gospel of St. Matthew, who, according to St. Jerome, first wrote in Judea in the Hebrew language. Tertullian, as well as many other ancient writers, afford us various testimonies to the integrity and genuineness of the gospels and other books of the New Testament in his time, as well as to their divine inspiration. See Bible.

Although the New Testament was written in Greek, an acquaintance with the Greek classics will not be found so conducive to the interpretation of it, as an acquaintance with the ancient Hebrew scriptures. The propriety of its being written in the Greek language will appear from the following historical fact. After the Macedonian conquests, and the division which the Grecian empire underwent among the commanders on the death of their chief, Greek soon became the language of the people of rank through all the extensive dominions which had been subdued by Alexander. The perfections with which the Jews were harassed under Antiochus Epiphanes, concurring with several other causes, occasioned the diffusion of a great part of their nation throughout the provinces of Asia Minor, Asia, Phoenicia, Persia, Arabia, Libya, and Egypt; which diffusion was in course of time extended to Achaia, Macedonia, and Italy. The unavoidable consequence of this was in a few ages, to all those who settled in distant lands, the total loss of that dialect, which their fathers had brought out of Babylon into Palestine, excepting only amongst the learned. At length a complete version of the scriptures of the Old Testament was made into Greek; a language which was then, and continued for many ages afterwards, in far more general use than any other. (See Septuagint.) The Jews, who inhabited Grecian cities, where the oriental tongue was unknown, would be naturally anxious to obtain copies of this translation. Wherever Greek was the mother-tongue, this version would be gradually adopted into use not only in private in Jewish houses, but also in public in their schools and synagogues, for the explanation of the weekly lessons from the law and the prophets. The style of it would condescendingly soon become the standard of language to them with regard to religious subjects. Hence would arise a certain uniformity in phraseology and idiom among the Grecian Jews, wherever sojourned, in respect of their religion and sacred rites, whatever might be the particular dialects which prevailed in the places of their residence, and were used by them in converting on ordinary matters. From the conformity and peculiarity in language now noticed, some critics, in order to distinguish the idioms of the LXX and New Testament from that of common Greek, have termed it Hellenistic; which see. Under that article we have intimated, that the habit which the apostles and evangelists had of reading the scriptures, and hearing them read, whether in the original or in the ancient version; would, by infecting their style, co-operate with the tendency which, as natives of Palestine, they would derive from conversation, to intermingle Hebraisms and Chaldeisms in their writings. Some modern writers, whilst they have adverted to this circumstance, have defended the dictation of the sacred penmen of the New Testament, and extolled it as altogether pure and elegant. Among these we may reckon Pfechenius and Blackwall, who, with this view, have made diligent researches among the writings of the ancient Greeks, for the discovery of words and phrases, which might appear to refer to what has been accounted Hebraism or Syrianism in the New Testament. Whereas the writings of the New Testament carry, in the very expression and idiom, an intrinsic and irresistible evidence of their authenticity. They are such as, in respect of style, could not but have been written by Jews, and hardly even by Jews superior in rank and education to those whose names they bear; and yet, under this homely garb, we find the most exalted sentiments, the closest reasoning, the purest morality, and the sublimest doctrine.

Abstraining from that lowly kind of beauty in language, which results from its softness and harmony, confided as an object to the ear, every excellency of style is relative, arising solely from its fitness for producing, in the mind of the reader, the end intended by the writer. Now in this view it is evident, that a style and manner may, to readers of one denomination, convey the writer's sentiments with energy as well as perplicity, which, to those of a different denomination, would convey them feebly, darkly, and, when judged by their rules of propriety, improperly. This seems to have been actually the case with the writers of the New Testament.
New Testament. The language of Matthew, Mark, Luke, and John, is better adapted to the readers, for whose use the Gospels and Acts were at first composed, than the language of Plato or Democritus would have been.

If we would enter thoroughly into the idiom of the New Testament, we must familiarize ourselves to that of the Septuagint; and if we would enter thoroughly into the idiom of the Septuagint, we must accustom ourselves to the study, not only of the original of the Old Testament, but of the dialect spoken in Palestine between the return of the Jews from the Babylonish captivity, and the destruction of Jerusalem by the Romans; for this, as well as the Hebrew, has affected the language both of the old Greek translation and of the New Testament.

Such is the origin and the character of the idiom, which prevails in the writings of the apostles and evangelists, and the remarkable conformity of the new revelation we have by them, though written in a different language, to the idiom of the old. It has been distinguished in the former by the name Hellenistic, not with critical accuracy, if regard be had to the derivation of the word, but with sufficient exactness, if attention be given to the application which the Hebrews made of the term Hellenist, by which they distinguished their Jewish brethren, who lived in Grecian cities and spoke Greek. It has been by some of late, after father Simon of the Oratory, more properly termed the Greek of the synagogue. It is acknowledged, that it cannot strictly be denominated a separate language, or even dialect, when the term dialect is conceived to imply peculiarities in declension and conjugation. But, with the greatest justice, it is denominated a peculiar idiom, being not only Hebrew and Chaldaic phrases put in Greek words, but even single Greek words used in phrases in which they never occur in the writings of profane authors, and which can be learnt only from the extent of signification given to some Hebrew or Chaldaic word, corresponding to the Greek in its primitive and most ordinary sense. This difference in idiom constitutes a difficulty of another kind from that which is created by a difference in dialect; a difficulty much harder to be surmounted, as it does not affect the form of the words, but the meaning.

It is pertinent, however, to observe, that the above remarks on the Greek of the New Testament, do not imply that there was any thing which could be called idiomatistical or vulgar in the language of our Lord himself, who taught always in his mother tongue. His apostles and evangelists, on the contrary, who wrote in Greek, were, in writing, obliged to translate the instructions received from him into a foreign language of a very different structure, and for the use of people accustomed to a peculiar idiom. The apparently respectful manner in which our Saviour was accosted by all ranks of his countrymen, and in which they spoke of his teaching, evinces that he was universally considered as a person of eminent knowledge and abilities. It was the amazing success of his discourses to the people, in commanding the attention and reverence of all who heard him, which first awakened the jealousy of the scribes and pharisees.

Although all the writers of the New Testament wrote in the idiom of the synagogue, we are not to conclude from hence, that there is no discernible diversity in their styles. As the same language admits of a variety of dialects, and even of provincial and foreign idioms, so the same dialect and the same idiom are susceptible of a variety of styles. The style of Paul has something peculiar, by which, in our opinion, there would be no difficulty in distinguishing him from any other writer. A disconcerting reader would not readily confound the style of Luke with that of either of the evangelists who preceded him, Matthew or Mark; and still less would he mistake the apostle John’s dictation for that of any other penman of the New Testament. The same differences of style will be discovered by one who is but moderately conversant in Hebrew in the writers of the Old Testament. In it we have still greater variety than in the New. Some of the books are written in prose and some in verse; and in each, the differences between one book and another are considerable. In the book of Job, for instance, the character of the style is remarkably peculiar. What can be more dissimilar in this respect, though both are excellent in their kind, than the towering flights of the sublimine Isaiah, and the plaintive strains of the pathetic Jeremiah? In the books of Scripture we can specify the conic style and the copious, the elevated and the simple, the euphonious and the diffusive.

How this diversity of style is reconcilable with the idea of inspiration, we have attempted to throw under the article INSPIRATION. See Campbell’s Prelim. Diff.

For other particulars in connection with the subject of this article, see BIBLE and CANON.

TESTAMENTARY ADOPTION. See ADOPTION.

TESTAMENTARY CAUSIS, in Law, are those that relate to testaments, which were originally cognizable in the king’s courts of common law, viz., the county-courts, and afterwards transferred to the jurisdiction of the church, by the favour of the crown, as a natural consequence of granting to the bishops the administration of intestate’s effects. This spiritual jurisdiction of testamentary causes is a peculiar constitution of this island; and for in almost all other (even in popish) countries, all matters testamentary are of the jurisdiction of the civil magistrate. And that this privilege is enjoyed by the clergy in England not as a matter of ecclesiastical right, but by the special favour and indulgence of the municipal law, and as it should seem by some public act of the great council, is freely acknowledged by Lindeuwode, the ablest canonist of the fifteenth century; and about a century before, in a canon of archbishop Stratford; also by the constitutions of cardinal Othobon; and likewise by archbishop Parker, in the time of queen Elizabeth. At what period of the time the ecclesiastical jurisdiction of testaments and intestacies began in England, is not ascertained by any ancient writer. It appears the foreign clergy were early ambitious of this power, though they were curbed by the edict of the emperor Justinian, which restrained the infraction or probate of testaments (as formerly) to the office of the magister causis; but afterwards by the canon law it was allowed, that the bishop might compel, by ecclesiastical censures, the performance of a bequest to pious uses. And therefore it fell within the jurisdiction of the spiritual courts by the express words of the charter of king William I. which separated those courts from the temporal. And afterwards, when king Henry I. by his coronation-charter, directed that the goods of an intestate should be divided for the good of his foul, this made all intestacies immediately spiritual causes, as much as a legacy to pious uses had been before. This therefore, says judge Blackstone, we may possibly conjecture, was the era referred to by Stratford and Othobon, when the king, by the advice of the prelates, and with the consent of his barons, invested the church with this privilege.

This jurisdiction is principally exercised with us in the consililuary courts of every diocesan bishop, or in the prerogative court of the metropolitan originally; and in the arches court, and courts of delegates by appeal. It is divisible into three branches; the probate of wills, the granting of administrations, and the fusing for legacies. The two former
former of which, when no opposition is made, are granted merely ex officio et debito jussu, and are then the object of what is called the voluntary, and not the contentious jurisdiction. But when a caveat is entered against proving the will or granting administration, and a suit thereupon follows, in order to determine either the validity of the testament, or who hath a right to the administration, this claim and obstruction are remedied by the sentence of the spiritual court, either by establishing the will, or granting the administration. Blackstone’s Com. vol. ii. See Subtraction of Legacies.

TESTAMENTO Guardian, Succession, and Tutors. See the subcaptives.

TESTAMENTO Annuity, Administration cum. If a testator makes his will, without naming any executors, or if he names incapable persons, or if the executors name refuse to act; in any of these cases, the ordinary must grant administration cum testamento annuo, to some other perfon.

TESTAMENTS of the Twelve Patriarchs, in Ecclesiastical History, a kind of apocryphal or spurious books, in which those patriarchs are introduced, speaking their last dying words, containing predictions of things future, and rules of virtue and piety; which they deliver to their sons as a choice treasure, to be carefully preferred, and to be delivered by them to their children. We have several editions of these in Latin; they were first published in Greek, by Grabe, and from his edition republished by Fabricius, and translated into English by Mr. Whilton. Cave places the anonymous author of this book in the year 192, or nearer the beginning of the second century. They are cited by Origen, and, therefore, were probably written before his time. Grabe thinks they were written before the time of our Saviour, and afterwards interpolated by a Christian. But Mr. Whilton affers, that they are really genuine, and one of the sacred apocryphal, or concealed books of the Old Testament. Cave supposes that this book was written by a Judaizing Christian; Grabe apprehends that it was written in Hebrew; Beausobre is of opinion that it was forged at the end of the first, or beginning of the second century, by some Christian converted from Judaism, and he supposes that the author was an Ebionite, and that he believed Jesus to be the Son of Joseph and Mary. Dr. Lardner is positive that these testaments are not the real last words of the twelve patriarchs; but the clear knowledge of Christian affairs and principles shews this book to have been written, or else very much interpolated, after the publication of the Christian religion. He says, there is nothing in this work that might not have been written by a learned Jew of the second century or later, though he thinks that the author was a Christian, and well versed in the Jewish learning; and moreover he is of opinion, that he is placed early enough by Cave, at the year 192. Lardner’s Works, vol. ii.

TESTATOR, or TESTATRIX, the person who makes his or her will and testament.

M. Gillet shews, that a person incapable of a legacy cannot demand any sum which the testator in his testament declares himself indebted to him in; in regard such a declaration of debt is presumed a fraud against the intention of the law.

TESTATUM, in Law, a writ in personal actions; where, if the defendant cannot be arrested on a capias in the county where the action is laid, but is returned non est inventus by the sheriff, this writ shall be sent into any other county, where such person is thought to be, or to have wherewithal to satisfy the demand.

It is called testatum, because the sheriff has before testified, that the defendant was not to be found in his bailiwick.

TESTE, a term commonly used in the close of a writ, where the date is contained, which begins with Teste meipso, if it be an original writ; or, if judicial, Teste, the lord chief justice, &c. accordingly to the court whence it comes. In some ancient formulas, we read Teste et falsus Anglicse. There must be at least fifteen days between the telle and return of every proces from the king’s bench into any foreign county. See WRIT.

TESTENICHT, in Geography, a small island in the gulf of Venice. N. lat. 44° 54’. E. long. 14° 47’.

TESTER. See Teston.

TESTES, Testiculi, in Anatomy; quia virilitatem tectantur; glandular bodies, peculiar to the male sex of animals, serving the office of secreting the fecundating fluid; hence their removal deprives an animal of the power of propagating its kind. See GENERATION, Male Organs.

The testes are wanting in most of the fih kind. The spinofish in general have neither teles nor parallas; but all the ceteaceous fishes have them, and not a few of the cartilago- ninous kinds. Those fishes that have them, have always two, as in land-animals; but they differ much in figure and situation in the several kinds, particularly in the whale and flat-fish. See Anatomy of Fish.

TESTIS of the Brain, two small hemispherical eminences, situated at the posterior and inferior aspect of the optic thalami, and now more generally known, together with two very similar ones immediately above them, by the name of tubercula quadrigemina. See Brain.

TESTES Synodales. See Synodales.

TESTI, Fulvio, Count, in Biography, an Italian poet, was born in 1593, at Ferrara, and settling, when young, at Modena, he rofe to the highest offices and honours of the state. Nevertheless, alternate prosperity and adversity visited him: incontinent and ambitious, he fell into disgrace with Francis I. who imprisoned him in the citadel of Modena, where he died in 1646. His poems are chiefly of the lyric class. The productions of his mature judgment are distinguished above those of his contemporaries for vigour and poetical spirit; and some of them, with respect to elevation of sentiment and beauty of imagery, will bear comparison with the productions of the best Italian poets. He also attempted tragedy in two compositions, intituled “Arinda,” and “L’Isole d’Alcina;” but their style is lyric rather than dramatic composition. Tiraboschi. Gen. Biog.

TESTIBUS His. See His.


Testicle, Operation of removing. See Castration.

TESTIGOS, Los, in Geography, a cluster of small islands, about ten leagues from the continent of South America, and the same distance from the island of Grenada. N. lat. 11° 25’. W. long. 62° 54’.

TESTIMON, a town of Pruflia, in the province of Erdmold; 16 miles S.S.E. of Hillberg.

TESTIMONIAL, a kind of certificate, signed either by the master and fellows of the college, where a person last resided, or by three, at least, reverend divines, who knew him well for three years last past; giving an account of the conduct and learning of the person.

Such a testimonial is always required before holy orders are conferred; and the bishop even ordinarily demands one of a priest before he admits him to a benefice.

TESTIMONIAL is also a certificate under the hand of a justice of peace, testifying the time and place when and where
a folder or mariner landed, and the place of his dwelling, and whether he is to pass.

TESTIMONY. See EVIDENCE.

Testimony is a serious intimation from another of any fact or observation, as being what he remembers to have seen, heard, or experienced. The evidence of testimony is either oral or written. Some have unreasonably forged, that this kind of evidence is solely and originally derived from experience. With regard to this it may be observed, that the evidence of testimony is to be considered as strictly logical, no farther than human veracity, in general, or the veracity of witnesses of such a character, and in such circumstances in particular, is supported, or hath not been refuted by experience. But that testimony, antecedently to experience, hath a natural influence on belief, is undeniable, in which respect it resembles memory. And in what regards single facts, it is a more adequate evidence than any conclusions from experience. When experience is applied to the discovery of the truth in a particular incident, the evidence is called presumptive; whereas ample testimony is accounted a positive proof of the fact. Testimony is capable of giving us absolute certainty even of the most miraculous facts, or of what is contrary to uniform experience. To this, when we have no positive reasons of mistrust or doubt, we are, by an original principle of our nature (analogous to that which compels our faith in memory), led to give an unlimited assent.

As on memory alone is founded the merely personal experience of the individual, so on testimony, in concurrence with memory, is founded the much more extensive experience, which is not originally our own, but derived from others. See on this subject Campbell's Philos. of Rhet. vol. i. book i. chap. 5. and Dissertation on Miracles, part i. sect. 1. and i. See FAITH.

For the credibility of human testimony, see CERTITUDE.

TESTINA, in Ancient Geography, a town of Italy, belonging to the Sabines, placed by D'Anville S.W. of Amiens.

TESTING, in Metallurgy, denotes the operation of refining large quantities of gold and silver, by means of lead, in the vessel called a test. This operation is performed by the destruction, vitrification, and forcification of all the extraneous and destructible metallic substances with which those noble metals are alloyed. It consists in adding to the alloyed gold and silver, a certain quantity of lead, and in exposing afterwards this mass to the action of the fire. The lead, by increasing the proportion of imperfect metals, prevents them from being so well covered and protected by the perfect metals; by uniting with them, it communicates to them a property which has of loosing very easily a great part of its inflammable principle; and lastly, by its vitrifying and fusing property, which it exercises with all its force upon the calcined and naturally refractory parts of the other metals, it facilitates and accelerates the fusion, the forcification, and separation of these metals. The lead, which in this operation is purified, and forcified along with it the imperfect metals, separates from the metallic mass with which it is then incapable of remaining united: it floats upon the surface of the melted mass; because by losing part of its phlogiston, (according to the former language of chemists,) it looses also part of its specific gravity, and lastly it vitrifies. The removal of the vitrified matter in the process is procured either by the nature of the vessel in which the melted matter is contained, and which, being porous, absorbs and imbues the forcified matter as fast as it is formed; or by a channel cut in the edge of the vessel through which the matter flows out.

The process of testing is generally performed in the same manner as that of cupellation. See ASSAYING and COPELLING.

But when great quantities of base metal are to be worked off from a little gold, recourse is had to a more expeditious method, that of testing before the bellows. An oval test is placed in a cavity, made in a hearth of a convenient height, and some mineralized sand or ashes prefured round it to keep it steady: the hole of a bellows is directed along its surface, in such a manner, that if ashes are sprinkled in the cavity of the test, the bellows may blow them completely out: some have an iron plate fixed before the bellows, to direct the blast downwards. To keep the surface of the test from being injured in putting in the metal, some cloths or pieces of paper are interposed. The fuel consists of billets of barked oak, laid on the sides of the test, with others laid crofs-wise on the test. The bellows impel the flame on the metal, clears the surface of ashes or sparks of coal, hastens the forcification of the lead, and blows off the scoria, as fast as it is formed, to one end of the test, where it runs out through a notch made for that purpose. About two-thirds of the forcified lead may be thus collected; the rest being partly absorbed by the test, and partly diffracted by the action of the bellows. Care must be taken not to urge the blast too strongly, lest some portion of the gold should be carried away by the fumes impetuously forced off from the lead, and some minute particles of it entangled and blown off with the scoria. Macquer's Chem. Dict. Art. Refining. Lewis's Ph. Techn. p. 146.

TESTO, Ital. literally left. In Music it implies a subject, or words of a song, or other vocal composition, to which some air, melody, or harmony, is to be composed.

It is a matter of great concern to understand well how to appropriate or adapt the music to the words of a song, to express the feme, and make a just application of the long and short syllables to the notes and time with which they are to be connected.

But this branch of the science, which depends greatly on the knowledge of poetry, has lain a long time almost unregarded; and even at present, very little care is taken in this point in the modern music, which is somewhat wonderful, since it was to this that the ancients attributed the extraordinary effects of their music; for by them this branch was most accurately observed, and by this they regulated and governed their measures, so that they might produce the desired effects; and some philosophers lay, the human passions and affections. Vellius de Poem. Cantu, &c.

TESTON, Tester, the name of a coin struck in France by Louis XII. in 1513, and in Scotland in the time of Francis II. and Mary queen of Scotland, so called from the head of the king, (testo or tête,) which was engraved upon it. The silver it contained was 11 deniers 18 grains; its weight, 7 deniers 1½ grains; and its value 10 foles. The coignage of it was prohibited by Henry 111, in 1575, when the value of it was augmented to 14 foles 6 deniers. Encyc.

A remarkable Scottish medal of this kind was that inaugurative of Francis II. of France with Mary of Scotland, though it is more properly indeed French, being, as it is thought, struck upon their coronation, as being a queen of that country. It presents busts of Francis and Mary, face to face, with three legends around them, the outermost of which contains their titles, the middle one this singular sentence:

"Which wonders how the devil it got there?"

HORA NONA DOMINUS HIS EXPIRAT HELLI CLAMANS, a most ominous motto, one would imagine, to a superfluous car. The innermost legend is only the name of the city of Paris. There are fine French testoons of Francis and Mary, likewise presenting them face to face, with the arms of France
France and Scotland upon the reverse, as is also the cafe of the medal just mentioned. These pieces are so fine and rare, that Dr. Hunter gave ten guineas for the one in his cabinet, which contains as vast and well-chosen a private collection, of all sorts of coins and medals, as any in the world.

Telloons, or shells, were first coined in Scotland about the year 1553; and they bore the bull of the queen and the arms of France and Scotland on the reverse: they were of the same intrinsic value with those of England, and were worth four shells; the half-telloon two, Scotch money. The silver telloon of Mary, chiefly of 1553 or 1562, with her bull, are rare, worth about 3½; half still more rare, valued at ½. Pinkerton on Medals.

The telloon, tfoot, or teller, among us, succeeded the great, which was introduced by Edward III. in 1354. It was also called shelling, and first coined by Henry VII. in 1503; and was rated at 12d. in the reign of Henry VIII. and afterwards reduced to 6d. The telloon of the first year of Edward VI. is extremely rare.

TESTOON, or TSTONE, a silver coin in Italy, and also in Portugal. At Florence, the telloon, or tfoot, as a money of account and a silver coin, is worth two lire, or three paoli. The telloon is a money of account at Lisbon, and is valued at 100 rees. And of the gold coins struck since 1722, there are the Dezesseis telloon of 1600 rees, and the Otto telloon of 800 rees. The silver coins are telloons of 100 and halves of 50 rees.

At Rome the fcondo, as a money of account, is divided into 3½ telloons; and among the silver coins, the telloons are valued at 3 paoli, the paoli being worth 5½d. Ferling nearly. See Coin.

TESTORE, CARLO GIOVANNI, in Biography, a violonist and music-master, resident at Verailles in 1770. In 1797 he published a treatise on music, entitled, “Musica ragionata,” in 4to. This author was perhaps the first Italian who adopted Rameau’s principles. He simplified his rules, and made his treatise more intelligible to principiant than Rameau himself, or his scientific commentator d’Alcambert. The full title of his book is “La Musica ragionata espressa familiaremente in dodeci Paffegeggiate a Dialogo, ornati 140 effempi Musicali in rami.”

TESTOUR, in Geography, a town of Africa, in the country of Tunis, on the Mejerdah; 40 miles S.W. of Tunis.

TESTUDO, in Antiquity, was particularly used among the poets, &c. for the ancient lyre, or lyre of Amphiion; because it was said to have been originally made; by its inventor Mercury, of the back or hollow shell of a testudo aquatica, or sea-tortoise, which he accidentally found on the banks of the river Nile.

Mr. Molyneux has an express discourse, in the Philosophical Transactions, to shew that the tortoise-shell was the basis of the ancient lyre, and that the whole instrument had thence the denomination telfudo; which account throws some light on an obscure passage in Horace, ode iii. lib. 4. mistaken by all the commentators:

“O, testudinis aurea
Dulcem quaesitum, Pieri, temperas!
O mutis quoque pictibus
Donatura cygni, si lebet, fonum!”

TESTUDO, Tortoise, in the Military Art of the Ancients, was a kind of cover, or screen, which the soldiers, e. gr. a whole company; made themselves of their targets, by holding them up over their heads, and standing close to each other.

Thus, if we suppose the first rank to have stood upright on their feet, and the rest to have stood lower and lower by degrees, till the last rank knelt down on their knees, so that every rank covering with their targets the heads of all in the rank before them, they represented a tortoise-shell, or a fort of sloping roof.

This expedient served to shelter them from darts, stones, &c. thrown upon them, especially those thrown from above when they went to the assault. It was also used in field-battles as well as in sieges.

TESTUDO was also a kind of large defensive engine, of an oval figure, composed of boards, and wattled up at the sides with wicker, which moved on several wheels, serving to shelter the soldiers when they approached the walls to mine them, or to batter them with rams.

TESTUDO, in Medicine, denotes a soft broad tumour, or gathering of impure humours between the skull and the skin, called also talpa, as resembling the subterraneous windings of the tortoise or mole.

TESTUDO, in Zoology, a genus of animals of the class of Amphibia and order of Reptiles; the generic characters of which are, that the body is furnished with a tail, and defended by a bony or cariacious integument above and below, or above by scales; and that the upper mandible of the mouth closes over the lower; without distinct or proper teeth, the teeth, as they are called in the generality of tortoises, being no other than the serrations of the mandibles.

Gmelin enumerates thirty-three species, which are distributed into the three classes of marines, fluctuabile, and land tortoises.

1. Marine Tortoises, or Turtles with pinniform Feet, the former being longer.

The animals of this class are distinguished from the land tortoises by their very large and long fin-shaped feet, in which are included the bones of the toes, the first and second on each foot being furnished with visible or projecting claws, the others not appearing beyond the edge. The shield, as in the land tortoises, consists of a strong bony covering, in which are imbedded the ribs, and which is coated externally by hard horny plates, in one or two species much thicker and stronger than those of the land tortoises. Mr. Scharpf, cited by Dr. Shaw, observes, that the apparent number of claws or projecting extremities on the feet of the marine tortoises, appears to be no certain criterion of the species; but, on the contrary, is found to vary so as to contradict the Linnean specific characters.

Species.

CORIACEA; Coriaceous Tortoise. Striated lengthwise; or brown turtle, paler beneath, with coriaceous shell, marked by five longitudinal tuberculated ribs. This is the largest of the marine tortoises, being found eight feet long, and one thousand pounds in weight. It is larger than others of its tribe, and its external covering differs by not being horny, but resembling strong leather, marked over the surface into small, obscurely subhexagonal and pentagonal divisions, without destroying its general smoothness. The longitudinal ribs or ridges are five; and comprehending those that border the sides, the number is seven. It has no under or thoracic shell; the head is large, and the upper mandible notched at the tip, so as to exhibit the appearance of two large teeth, between which, when the mouth is closed, is received the tip of the lower mandibles; the fins are large and long, and covered with a tough leathery skin; the tail is rather short and sharp-pointed. This species is a native of the Mediterranean, and has occasionally been taken on the coast both of France and England. It is also found, not only in the Eu-
TESTUDO.

European seas, but in those of South America, and about one of the African coasts. The Greeks, according to Cépæda, were well acquainted with this specimen, and used it in the construction of the lyre or harp. (See Testudo, in Antiquity.) Pinnant says, that this species is extremely fat, but the fish coarse and bad; but the Cartulians will not eat other species. The small testiform described by Pinnant in the Phil. Trans. for 1771, is said to be the young of this animal. Gmelin mentions this and another as variegated.

IMBRICATA. The imbricated or variegated turtle with thirteen imbricated scales on the disk; these lap over each other at the extremities like tiles on the roof of a building. The head is smaller than in other turtles; the neck longer, and the head narrower, sharper, and more curved, so as considerably to resemble the bill of a hawk, and from this circumstance the animal derives its popular name of the "hawkbill turtle." This is a native of the Asian and American seas, and is sometimes found in the Mediterranean. It has been often known to measure five feet in length, and to weigh 500 or 600 pounds. In the Indian ocean it attains a prodigious size. Its shell was anciently used for a shield, and still serves for that purpose among barbarous nations. The flesh is not esteemed as a food; the lamelle or plates of the shell, being much stronger, thicker, and clearer than those of any other kind, constitute its sole value. See Tortoise-Shell.

MYDAS. Brownish turtle, with thirteen scales on the disk; the green turtle of some writers, with two nails on the fore-feet, and angle ones on the hind-feet. This common green turtle (elephantine), is so named from the green tinge, derived from the vegetable substances on which it feeds, often exhibited by its fat, when the animal is in its highest perfection. It is one of the largest of this genus, often measuring above five feet in length (sometimes more than five), and weighing more than 500 or 600 pounds. Its colour is a dull pale brown, variegated with deeper undulations, but not exhibiting the beautiful colours which distinguish the T. imbricata. Its flesh, however, is in such estimation, that the inhabitants of the West Indian islands have long considered it as one of the most excellent articles of food, and have introduced asimilar taste into some of the European nations. In our own country it is much esteemed, and considerable quantities of it are imported to supply the luxury of the metropolis. Its introduction, however, cannot be traced farther than about 50 or 60 years backward. Sir Hans Sloane informs us, in his History of Jamaica, that forty sloops were employed by the inhabitants of Port Royal, in Jamaica, for catching them, and that the markets there are supplied with turtle as ours are with butcher's meat. The method of taking them at the Bahama islands is by striking them with a small iron peg two inches long, put in a socket at the end of a shaft twelve feet long. Two men usually act for this work in a little light boat or canoe, one to row and gently steer the boat, while the other stands at the head of it with his striker. The turtle are sometimes discovered by their swimming with their head and back out of the water, but they are often discovered lying at the bottom, a fathom or more deep. If a turtle perceives he is discovered, he starts up to make his escape, the men in the boat pursuing him, endeavour to keep sight of him, which they often lose, and recover again by the turtle putting his nose out of the water to breathe; thus they pursue him, one paddling or rowing, while the other stands ready with his striker. It is sometimes half an hour before he is tired; then he flinks at once to the bottom, which gives them an opportunity of striking him, which is by piercing him with an iron peg, which slips out of the socket, but is fastened with a string to the pole. If he is spent and tired by being long purfued, he tamely submits, when hauled, to be taken into the boat or hauled ashore. There are men who by diving will get on their backs, and lay propping down their hind parts, and raising the fore-part of them by force, bring them to the top of the water, while another slips a noose about their necks.

The sea tortoises, or turtles, says Catesby, never go on shore but to lay their eggs, which they do in April: they then crawl up from the sea above the flowing of high water, and dig a hole, above two feet deep in the land, into which they drop in one night above an hundred eggs, at which time they are so intense Nature's work, that they regard none that approach them; but will drop their eggs into a hat, if held under them; but if they are disturbed before they begin to lay, they will forsake the place, and seek another. They lay their eggs at three, and sometimes at four different times; there being fourteen days between every time; so that they hatch and creep from their holes into the sea at different times also. When they have laid their complement of eggs, they fill the holes with sand, and leave them to be hatched by the heat of the sun, which is usually performed in about three weeks. It may be proper to add, that the eggs are about the size of tennis-balls, round, white, and covered with a smooth parchment-like skin. Gmelin mentions several varieties of this species.

CARINATA. The variegated turtle, with fifteen dorso-lateral scales, those of the middle range gibbous towards their tips. This species is larger than any yet discovered, except perhaps the T. carinata. It is called the "loggerhead turtle," and though it resembles the last species, or green turtle, it is distinguished by the superior size of the head, the proportional breadth of the shell, and by its deeper and more variegated colours: but the principal distinction consists in the number of dorso-lateral segments or sections of the shell, which amount confantly to fifteen. The fore-feet are very large and long; the hind-feet much shorter, though broad. In a commercial view, this species is of little importance; its flesh being rank and coarse, and the lamelle of the shell too thin for general use. It is said, however, to afford a good quantity of oil, which may be used for lamps, &c. This turtle is very strong and fierce, and even dangerous. It is an inhabitant of the same seas with the green turtle, but has been found in remote latitudes, even in the Mediterranean, and particularly about the coasts of Italy and Sicily.

MACROPUS. With an ovate, carinate, emarginate shield, and the feet very large and bifurciously unguiculated.

B. Fluviatile, with palmatated feet, shell joined with the sternum by a membrane, and supported in the middle on both sides by two processes of the sternum.

ORBICULARIS. The T. europea of Schneider, with oval, flatish, smooth, dark brown shell, marked with very numerous yellowish spots and streaks. This speckled tortoise of the "Naturalist's Miscellany," or T. meleagris, is of small size, the shell measuring about four or five inches in length, and its disk composed of thirteen, and the margin of twenty-five pieces; the under shell whitish-yellow, tinged towards the joints with brown; the head ovate, somewhat convex above, and flatish on each side and beneath; the skin of the neck lax and wrinkly; the legs short and scaly, feet webbed, fore-feet having five toes and hinder only four; the claws on all the feet sharp-pointed, and crooked; the tail nearly half as long as the body, thin, attenuated, compressed and scaly, and also spotted like the body.

This elegant species is a native of many parts of Europe, being

Vol. XXXV.
being found in Italy, Sardinia, France, Hungary, Prussia, &c., inhabiting lakes and muddy waters, and feeding on aquatic plants, insects, snails, and small fish. The flesh is said to be good as food, for which purpose it is sold in the markets, and occasionally kept in ponds, and fed or fattened with lettuce-leaves, bread, &c. &c. It may be conveniently kept in a cellar and fed with oats, scattered on the floor, which it greedily eats when they begin to germinate. It deposits its eggs in sandy and sunny places in the beginning of spring, which are not hatched, as it is pretended, till the succeeding spring.

**MEMBRANACEA.** With three claws on the feet, and shell frilled on the back, membranaceous, ovate and grey. Found in the sea that washes Guiana. See T. Ferrox.

**TRINITIUS.** With three claws on the feet, the disk of the back rugose and orbicular, the lower border smooth, and nostrils in a cylinder elevated above and projecting beyond the head. Found rarely in the Nile, and supposed to be the same with the former.

**CARTILAGINA.** Shell orbicular, membranaceous, frilled on the back; three claws on the feet, and nope cylindrical and prolonged. This is the T. Boddaerti and a rare species. See the next article.

**Ferrox; Fierce Tortoise.** With ovate, cartilaginous shell; three claws on the feet, and tubular, prominent nostrils. Dr. Shaw queries whether the T. rostrata of Schopf, the T. with palmed feet, &c. of Thunberg, the T. cartilaginea of Boddaert, the T. Boddaerti of Schneider, the T. triunguis of Forkell, and the T. membranacea of Blumenberg, do not belong to this species. This is a remarkable species, and distinguished by the unusual nature of its shield, which is hard and offensively only in the middle part, while the edges gradually degenerate into a flexible coriaceous verge; obtusely marked with five or six transverse bands, and granulated with small warts or prominences, gradually enlarging as they approach the flexible edge; the head rather small, somewhat trigonal, with the snout much lengthened, and the upper part drawn out into a sub-cylindrical form, terminated by the nostrils, and projecting much beyond the lower mandible; the neck, when retracted, thick, and surrounded with many folds of skin, but when exerted, equal in length to that of the whole shell; the legs short, thick, and covered with a wrinkled skin; the feet furnished with strong and broad webs, connecting the three last toes of each; the three first on each foot furnished with strong claws, and the remaining ones unarmed; having, besides the proper toes, two spurious ones on the hind and one on the fore feet, strengthening and expanding the web; the tail short, pointed, and curving inwards; the eyes very small and round; the colour above dark brownish, olive, and below white; the shell marked beneath in a very elegant manner, with ramifications of vellum.

This species is found in Pennsylvania, Carolina, &c. &c.; and is prized, differently from most others of the tribe, of considerable vigour and swiftness of motion, springing towards its affluent, when attacked, with great alacrity and ferocity; about a foot and half long, and fifteen inches broad. It was first described by Dr. Garden. Its flesh is said to be extremely delicate, being equal, if not superior, even to that of the green turtle. The great soft-bodied turtle, described by Mr. Bartram in his Travels, appears to be the same with this. Found in all the rivers, lakes, and pools of East Florida, weighing from 30 to 40 pounds. The T. rostrata of Thunberg seems to be the young of the species above described; and the T. triunguis of Forkell is allied to the same species. Shaw.

**Scabra.** With smooth discoloured head, and shield oval, convex, carinated and rough. The *fabra* of Linnaeus is described as having palmed feet and flattish shell, with all the intermediate scutella elevated on the back. The shell of this species is figured by Seba; it measures about two inches and a half in length, and nearly two inches in breadth; being of a cordate figure, or somewhat pointed at the bottom. Its colour is light-reddish, variegated on the head and shell with white lines and spots; the feet marked with red specks, and having each five toes with sharp claws; the head prominent, and eyes small. Shaw.

**Squamata; Scaly Tortoise.** With ovate body, smooth beneath, but covered above, together with the neck, feet, and tail, with numerous scales. According to Bontius, in his History of Java, this singular species is an inhabitant of fresh waters, where it burrows under the banks, in order perhaps to deposit its eggs. The Javanese call it *taunab*, or the digger, and the Chinese *lary*, or the runner, a burlesque title given to it on account of its flow pace. Its flesh is said to be extremely delicate; and the Chinese use the pulvcrized scales dissolved in water, as a remedy in dysenteric cafes and against the colic. It is said to prey on small fish. This species seems to connect the lizard and tortoise tribes. Shaw.

**Lutaria; Mud or Brown Tortoise.** With flattish shell, and tail half the length of the body; carinated, says Gmelin, behind with three scutella. This species is said to be common in many parts of Europe, as well as Asia, being found in India, Japan, &c. According to Cépède, it is not more than seven or eight inches from the tip of the nose to that of the tail, and about three or four inches in breadth; the disk consists of thirteen pieces, frilled and slightly punctuated in the centre, and along the middle range runs a longitudinal carina; the margin consists of twenty-three pieces, bordered with slight fimbria; the colour of the shell is blackish and also of the skin; the feet are webbed, with five toes before, and four behind; the exterior toe of each foot is unarmed; the tail is stretched out in walking, from which circumstance the animal has been called *Mus aquaticus.* Like other tortoises, it sometimes utters a kind of broken hif. This animal is common in France, and particularly in Languedoc and many parts of Provence; and in a lake, situated in the plain of Durance, such numbers were found as to supply the neighbouring peafantry for more than three months. Although this species be aquatic, it always lays its eggs on land, digging a hollow and covering them with mould. This animal is useful in a garden, which it frees from noxious animals, without doing any mischief itself. It may be domesticated, and kept in a bason or receptacle of water, so contrived on the edges as to give it a ready egress, when it wishes to wander about for prey. In fifth-ponds it is destructive. Shaw. Gmelin mentions two varieties, viz. T. tabulata and T. campanulata.

**Scorpioidea.** See T. Fimbriata.

**Hermanii.** With four claws on the feet, and the tip of the tail ungueulated. See T. Tricarinata.

Gmelin mentions several varieties of this species.

**Carolina.** With digitated feet, gibbous shell, and no tail. This is the T. clausa, or close tortoise, of Linnaeus and other writers, with blackish shell, irregularly spotted with yellow, with obtuse dorsal carina, and bivalve under-shell completely folding the upper, whence it obtains its name. The under part of the shell is so continued round the margin, that when the animal withdraws its head and legs, it is able accurately to close all parts of the shell together, so as to be perfectly secure. The defence of this little animal, which rarely exceeds four or five inches in length, is such, that it is uninjured by a weight of 500 or 600 pounds, and...
and able to walk under this heavy load. It is a native of many parts of North America, found chiefly in marshy situations, and occasionally in the driest and hottest places. It is principally fought for on account of its eggs, which are reckoned a delicacy. It feeds on small animals, as beetles, mice, and even serpents, which it draws into its shell, and crushes to death; and also on various vegetable substances.

**Palestris.** With depressed shell, five claws on the fore-feet, and four on the hind-feet; found in the lagoons of Jamaica, and feeding food in the adjoining meadows. This is the T. terrapin of Schaepp, and the T. concentrica of other writers, with sub-depressed, sub-carinated, oval yellow shell, with the scutella marked by concentric brown zones. The shell measures from four to six inches, or more. It is a native of North America, and sold in the markets of Philadelphia, and elsewhere, under the name of "Terrapin," which name is indiscriminately applied in America to several other species. It is common, as we have already said, in Jamaica, and first described by Dr. Brown, in his "History of Jamaica," who says it is a wholesome and even delicate food. In the Leverian Museum there is a large and beautiful specimen of the shell of this species. Shaw.

**Caspiaca.** With orbicular shell, scaly head, five claws on the fore-feet, four on the hind, and naked tail. Gmelin represents it as a native of Hircania, inhabiting fresh waters, and sometimes to a vast size. The pieces composing the disk are sub-quadrate; those of the border parallellogrammic; the color variegated with black and green; the lower shell blackish, spotted with white.

**Clausa.** See T. Carolina, supra.

**Pennsylvanica.** Tortoise, according to Schaepp, with smooth, elliptic, brown shell, with flatish back, the first range of scutella sub-oblanceolate and sub-imbricated, the first sub-triangular; and according to Gmelin, with five claws on the fore-feet and four on the hind, and the apex of the tail hatory and acute. This is the small mud tortoise of Edwards; the shell measuring three or four inches in length. The head on the parts surrounding the jaws and eyes is of a reddish-yellow colour; the upper part, as well as the neck, legs, and tail, dull; feet webbed; the tail small. It is a native of North America, and is found in Pennsylvania, &c. inhabiting muddy waters. When living, it is said to exude a strong musky odour. Mr. Schaepp mentions a variety, and another occurs in the Leverian Museum. Shaw.

**Serpentina.** The snake tortoise, characterized by Schaepp as having an ovate, depressed, triply carinated, sharp-scaled shell, rounded and acutely ferrated at the posterior margin; and by Gmelin as having digitated feet, sub-carinated shell, behind obtuse, and acutely quinidentated. This is the ferrated tortoise of Pennant. It is a native of North America, inhabiting stagnant waters, growing to the weight of fifteen or twenty pounds, or more, preying on fish, ducklings, &c. seizing its prey with great force, and at the same time stretching out its neck, and hissing at the same time. The head is large, depressed, triangular, and covered with a scaly and warty skin: the orbits of the eyes are oblique; the mouth wide; the mandibles sharp; the neck covered by scaly warts; the toes distinct; the tail straight, and about two-thirds the length of the shell; and the under part of the body covered by a looite, wrinkled skin, bafet with smallish foot-seales and granules. This animal conceals itself in muddy water, leaving out only a part of its back, and thus appearing to be a stone or other inanimate object, more easily obtains its prey. In New York it is known by the title of the "snapping tortoise."

**Spengeli.** See T. Serrata, infra.

**Fimbriata.** Tortoise, according to Bruguiere, with oval, sub-convex, triply carinated shell, sub-digitated feet, cylindrical hout, and neck fimbriated on each side. This is an animal of very singular and disagreeable appearance. The shell is about fifteen inches or more in length, and its breadth eleven; but the whole animal, from the nose to the end of the tail, is two feet three inches. The head is large and flat, rounded in front, and edged on the sides with warty and wrinkled membraneous appendages, about five inches wide, and covered behind by a three-lobed prominence; the nose resembles a proboscis, cylindrical, ten lines long, truncated, pierced by the nostrils, at the tip, where they are separated by a cartilaginous division; the eyes are round, seated at the base of the proboscis, and ten lines distant from each other; the mandibles are equal in length, and entire; the glove of the mouth is wide; the neck seven inches long, and four and a half broad: above flat and warty, and furnished on each side with five fimbriated membraneous appendages disposed lengthwise, and alternately larger and smaller; the under part of the neck is beset with four similar appendages, placed opposite to the two on the head, and increased by two longitudinal wrinkles: the fore-feet are scaly and warty, having five indistinct toes, with as many longish sharp claws, convex above and flat beneath; the hind-feet are also scaly, with less indistinct toes, having four claws, the fifth toe being unarmed, and very short: the tail is an inch long, bent slightly, and covered with a granulated skin: all the thirteen semicircular pieces, of which the shell consists, are wrinkled and irregularly notched at the hind part; the twenty-five marginal pieces are almost square, radiated on the surface with oblique wrinkles, and toothed in the interior edge. The colour of the whole is brown, somewhat paler beneath. This animal is said to be a native of Guiana, but is now rare in the rivers of Cayenne, as it has been plentifully taken by fishermen, it being considered as excellent food. It feeds on aquatic plants, and wanders by night by some distance in search of pasturage. It has been faggotted, but without certainty, that this is the T. scorpionides of Linnaeus. Shaw.

**Picta.** Tortoise with plane shell, marked on both sides with a double spot of a black-blueish colour; scutella surrounded with a yellow margin, and neck flirated longitudinally with yellow and black; or tortoise with oblong, slightly convex, smooth, brown shell, with the scutella bordered with yellow. This is the cinereus tortoise of Brown's Zoology, and sufficiently distinguished from all others by the remarkable colours of the shell. This is a fresh-water species, and inhabits flow and deep rivers in North America, and should have been referred by Gmelin to his second class. In clear sunny weather these animals are said to assemble in multitudes, fitting on the fallen trunks of trees, stones, &c. and immediately plunging into the water on the least disturbance. They are said to swim very swiftly, but to walk slowly; to be able to continue many hours entirely beneath the water, but not to survive many days if kept out of their favourite element. They are very voracious, destroying ducklings, &c. which they seize by the feet, and drag under water. They are sometimes used as a food. The colour, as has been above observed, varies; being sometimes of a blackish-brown, at other times of a reddish-chestnut: the yellow markings are also either pale or deep in different individuals, and sometimes whitish; the inferior, or under edges of the upper shell, as well as the upper edges, or commissures of the lower, are elegantly streaked with black, as if artificially painted, and this variation is continued over the skin of the sides of the body. Shaw.

**Guttata.** Tortoise spotted, with oblong, moderately

[3 E 2] convex,
cewes, smooth, brown shell, with scattered yellow spots. This is T. punctata of Schepf. It is a rather small species, and a native of North America, inhabiting rivers and lakes. The young are scarcely larger than pigeon’s eggs, and are very black, beautifully spotted with gold colour.

**LONGICOLLIS; Long-necked Tortoise.** Smooth, ovate, with extremely long neck. This species is a native of New Holland, and is of the river or fresh-water kind. The colour of the whole animal above is deep olive-brown; beneath paler, and inclining to whitish. Shaw.

C. *Land tortoises, with elevated unguiculated feet, coeves shell, and bony connivences joined with the sternum.*

**DENTICULATA; Tortoises with sub-digitated feet, and orbicular-crested shell, with denticulated marginal segments.** The shell is of a pale yellowish-brown colour, about four inches long and three broad, covered on the disk by broad hexagonal and pentagonal scutella, of a flattened form, with a large distinct middle space, granulated by small tubercles, and the remainder marked by five lines or furrows. The edge of the shell consists of twenty-three pieces, projecting in a ferrated manner round the outline. It is supposed to be a native of North America. The feet, in Gmelin’s edition of the Syllena Nature, are said to be without distinct toes; and the tail short.

**GRECI;** The common land tortoise, with sub-digitated feet, hinder part of the shell gibbous, lateral margin very obtuse, and feutella flattish. Gmelin.

It is described by others as the tortoise with hemispherical black and yellow shell, gibbous behind; the pieces composing the disk convex, and the sides obtuse. This tortoise is supposed to be a native of almost all the countries bordering on the Mediterranean sea, and to be more frequent in Greece than in other regions. It is found in the European Archipelago islands, and in Corfica and Sardinia, and also in many parts of Africa. In Greece it is an article of food; the eggs are eaten boiled, and the blood is often swallowed recent. In September the animal hides itself under ground, and emerges in February; it lays its eggs in June, in a small hole on a funny spot, out of which, after the first rains of September, the young are hatched. In England it returns about the end of October, and re-appears about the middle of April; but these scasons vary with the climate and weather, &c. The males often fight, butting at each other with a noise that may be heard at a considerable distance. This animal lives to a most extraordinary age, exceeding the period of a century. One of the most remarkable instances is that of a tortoise introduced into the archiepiscopal garden at Lambeth, in the time of archbishop Land, and as near as can be collected from his history, about the year 1633, which continued to live there till the year 1753, when it was suppos’d to have perished rather from accidental neglect on the part of the gardener, than from the mere effecl of age. This tortoise has had the honour of being commemorated by Derham, and many other writers, and its shell is preserved in the library of the palace at Lambeth.

The general manners of the tortoise, in a state of domestication in this country, are very agreeably detailed by Mr. White, in his History of Selbourn. “A land tortoise,” says Mr. White, “which has been kept thirty years in a little walled court, retires under ground about the middle of November, and comes forth again about the middle of April. When it first appears in the spring, it discovers very little inclination for food, but in the height of summer grows voracious; and then, as the summer declines, its appetite also declines; so that for the last weeks in autumn it hardly eats at all. Milky plants, such as lettuces, dandelions, low-thistles, &c. are its principal food. “The tortoise is totally a diurnal animal, and never flies after it becomes dark. The tortoise,” adds Mr. White, “like other reptiles, has an arbitrary homach, as well as lungs, and can refrain from eating, as well as breathing, for a great part of the year. I was much taken with its facility, in differing those that do it kind offices; for as soon as the good old lady comes in fight who has waited on it for more than thirty years, it hobbes towards its benefactresses with awkward slowness; but remains inattentive to strangers. Thus, not only the ox knoweth his owner, and the ass his master’s crib,” but the most abject and torpid of beings distinguishes the hand that feeds it, and is touched with the feelings of gratitude. This creature not only goes under the earth from the middle of November to the middle of April, but sleeps great part of the summer; for it goes to bed in the lengthiest days at four in the afternoon, and often does not stir in the morning till late. Besides, it retires to rest for every shower, and does not move at all in wet days. When one reflects on the state of this strange being, it is a matter of wonder that Providence should bestow such a feeble waft of longevity on a reptile that appears to relish it so little as to squander away more than two-thirds of its existence in a joyless state; and be to itself and its kind so torpid and so slow in the progress of its nobler affections.”

**CARINATA; Tortoises with digitated feet, and gibbous shell, with the four first dorsal scutella carinated, and entire sternum; found in warm regions, but very little known.**

**GEOMETRICA.** Shell ovated, with all the elevated scutella above plane, marked with yellow striae issuing from the centre in form of a star; or, according to others, this is the tortoise with ovate black shell, and elevated scutella radiated with yellow; the T. teledata minor of Ray. The pieces of which the disk of the shell consists are very prominent, rounded, or squared pretty distinctively with numerous lines on their sides, and terminated above by a yellowish, flat, square, or rather hexagonal roughened space or centre, from which proceed, in a radiated direction, several well-defined yellow striae towards the edge; thus constituting a beautiful kind of geometrical appearance on the black ground colour on which they are disposed: the marginal pieces, which are commonly twenty-four, sometimes twenty-six, in number, are also streaked with yellow, but in a somewhat different style.

**The native country of this beautiful tortoise is perhaps not truly afeerted; though the shell is more frequently seen in Europe than that of almost any other kind. It is said, however, to inhabit Asia and Africa, and even to be found in America. According to Mr. Thunberg it is particularly common in shrubby places about the Cape of Good Hope. It is said to lay about twelve or fifteen eggs at a time.**
time. The count de Cépède supposes this species to be the Terrapin of Dampier, which that navigator represents as very beautifully variegated, and as delighting in moist and marshy places; adding, that its flesh is esteemed as a food, and that it is found in plenty on the coasts of the Pine islands, between the continent of America and Cuba: they are found in the forests, where they are easily taken: the hunters mark them on the shield, and let them wander about the woods, being sure to find them again at no great distance, every one easily recognizing his own property, and afterwards carrying them to Cuba. — Shaw.

**Pusilla; Little Tortoise.** With sub-digitated feet, and hemispheric shell, with convex, trapcezial scutella, frilated on the margin, and punctuated on the disk. This is the African land tortoise of Edwards, and thus described by him from a specimen obtained from Weil Barbery. "The iris of the eye is of a reddish hazel colour; the lips hard, like the bill of a bird; the head covered with scales of a yellowish colour; the neck, hind legs, and tail, covered with a flexible skin of a dirty flesh-colour; the fore-legs covered with yellow scales on their outsidies, which are partly exposed when the legs are drawn in; the shell round, and pretty much rising on its upper side, and flat beneath; the pieces or compartments are of a yellowish colour, clouded and spotted with large and small irregular dusky or blackish spots, and are also ferrugous or creased, the creases being, one within the other, till they reach the top or middle part of each; the tail is thick, feally, and about an inch in length; and the vent is situated within the tail itself near the base; there are five claws on the fore-feet, and four on the hind, all strong, black, rather bowed, and sharp-pointed." This species is found at the Cape of Good Hope, and much resembles the T. graeca.

**Indica.** Tortoise with brown shell, reflected above the neck, and marked with a tubercule on the three upper scutella. This is the great Indian tortoise, first described by Perrault in the "History of Animals," published by the Royal Academy of France, and confounded by M. Cépède with the T. graeca. It is found in India, on the coast of Coromandel, &c. Of this there are two varieties, one brought from the Cape of Good Hope, and another from the Southern islands.

**Sulcata.** Tortoise with a tail, digitated feet, gibbose shell, and scutella lineated and circumcised with a furrow; or tortoise with brown ovate shell, with furrowed scutella yellow on each side. This is one of the larger species of land tortoises, being about a foot or more in length from the nose to the tip of the tail. The shell is very convex, and has the general habit of the graeca and geometrica as to shape. This species is said to be a native of the West Indies, and perhaps may be the "Hicater" of Brown, described in his "History of Jamaica." Dr. Shaw suggests that this species may be the same with T. tabulata.

**Planaria.** Tortoise with digitated feet, and shell ovate, convex, and smooth. Found at Surinam.

**Americana Terrestris.** Tortoise with oval, gibbose shell; scutella yellow in the middle of the disk; the margin marked with shining, black, furrowed, lateral polygons. This is conjectured by Gmelin to be the labotii of the Brazilians, and the cagado of the Portuguese. Found in South America.

**Tabulata.** Tortoise of oblong, gibbose, brown shell, with the scutella of the disk rectangular and furrowed; with yellowish centres. This was first described and figured by Seba's "Theaurus," and there said to be a native of Brazil, though it is believed to be rather an African species. The general length of the shell is about five or six inches: suspected to be the same species with T. fulcata, supra. Shaw.

**Marginata.** Tortoise with blackish-brown, oblong, gibbose shell, variegated with yellow, widened and depressed on the hind part. The true native country of this species is not very distinctly known. Mr. Schreber inclines to think that it is an American species. Cépède has confounded it with the T. graeca. Shaw.

**Radiata.** Tortoise with ovate black shell, and flatish scutella radiated with yellow. This is the great chequered tortoise-shell of Grew's Maf. Reg. It has been concluded by some persons, from a general resemblance in the pattern of the shell, and a similarity in colours, that this is the same species with T. geometrica, or a variety of it. But Dr. Shaw has pointed out a variety of differences between them, such as warrant our flating that the two shells are perfectly distinct. Grew, who has described this species, says that its native country is Madagascar; but Dr. Shaw suggests that it is also a native of Jamaica, and that in characters and size it agrees with the "Hicater" tortoise mentioned in Brown's Zoology. Shaw.

**Rugosa.** Tortoise wrinkled, with black wrinkled shell, mottled and variegated with yellow; with the middle dorsal pieces subquadangular, and fiddle-shaped. In the Leverian museum there is a variety, or perhaps a sexual difference of this species.

**Elegans.** Tortoise with orbicular, convex, yellow shell, with transverse, oval, brown spots. Seba has described it under the name of the T. terrestris Cellonica elegans minor. Shaw.

**Areolata.** Tortoise with moderately convex shell, with subquadangular, elevated, deeply furrowed scutella, and depressed rough areole. This is described by Seba under the appellation of T. terrestris Brasilienis.

**Serrata.** Tortoise with depressed yellowish shell, minutely streaked with dusky specks; all the scutella of the disk curvate, and the hinder margin of the shell serrated. This is supposed by Dr. Shaw to be the T. spengleri of Gmelin's Linnean System.

**Tercarinata.** Tortoise with oval, slightly convex, shell, with entire margin, and all the scutella of the disk curvate. This species agrees, in shape and other particulars, with Linnaeus's description of his T. orbicularis. Shaw.

**Scripta.** Tortoise with orbicular depressed shell, with all the scutella marked by variously-formed characters, and the marginal pieces spotted beneath. This is the T. scabra of Thumber. Its native place is not ascertained. Shaw.

**Galeata.** Tortoise with depressed oval shell, with the three middle scutella sharply curvate, and twenty-four marginal pieces. The native place of this species is not known; but it was brought to Mr. Retzius from India, and lived two years kept in fresh water; it fed on bread, &c. and sometimes on flies. From the beginning of October to the middle of May it remained without food, fearfully elevating its head above the water. It delighted in fine weather, and endeavoured to climb up the sides of the vessel occasionally, in order to enjoy its influence. It is doubtful, whether this be the T. scabra of Linnaeus. It is called galeata by Retzius, from the armed or cataphract covered covering of the head. Shaw.

**Granulata; Chagria Tortoise.** With orbicular, flatish, granulated shell, with cartilaginous border. This species seems to be allied to the T. ferox, having the shield furnished with a cartilaginous and flexible border. It is described by M. Cépède, and was brought from India by M. Somerat. Shaw.

Dr. Shaw, among the sea-tortoises or turtles, has described
the turtle with green variegated shell, so named by the count de Cépéde. These turtles are said to be found in great numbers in the Southern ocean, and about Cape Blanco, in New Spain. They also occur in the gulf of Mexico, and many of the large American rivers, both above and below the line; but they have never been discovered in the seas of the Old Continent. The flesh is said to be very delicate; and is even preferred in some places to that of the common turtle. M. Bonarea is said by Cépéde to have first described this species.

The "trunk turtle," or *tortue nasiforme*, has not been accurately described. Count de Cépéde says, that it is a native of the American seas, and bears a general resemblance to the common or green turtle; but is distinguished by having a large soft tuberole on the tip of the snout, in which are situated the nostrils. It is eaten in the same manner as the green turtle, and is chiefly found in the equatorial regions. (Shaw's General Zoology, vol. iii. pt. 1.)

*Tetudo* *Peliformis Quadrata*, an hemispherical vault, or ceiling of a church, &c. in which four windows are so contrived, as that the reft of the vault is quadrable, or may be squared.

The determination of these windows was a problem proposed to the great mathematicians of Europe, particularly the cultivators of the new calculus differentials, in the Acta Eruditorum Litterae, by fig. Viviani, under the fictitious name of A. D. Pollfle pelliforme, which was the anagram of poltrimi Galilei dicipulo.

It was solved by several persons, particularly M. Leibnitz, the very day he saw it; and he gave it in the Leipzig Acts in a variety of ways; as also did M. Bernouilli, the marquis de l'Hospital, Dr. Wallis, and Dr. Gregory.

**TESTWOOD** in Biography, a lingh man in the choir of Windor, was burnt for his intemperate zeal in the cause of Protestantism, 1544, when Marbeck was Lisewise condemned, but afterwards pardoned.

**TESZERSKEY**, in Geography, a town of Croatia; 6 miles S.W. of Novi.

TET, a river of France, which rises in the Pyrenees, a little above Mont Louis, and runs into the Mediterranean, 7 miles E. of Perpignan.

**TETANUS**, in Medicine, a disease consisting in a spasmodic contraction of several of the muscles of voluntary motion, and more particularly of those which shut the lower jaw: and this being a constant and prominent symptom, the affection is commonly known by the name of *locked jaw*. The ipasm of the muscles is of the tonic kind; or that in which the excessive contraction continues for a considerable time, without any interval of complete relaxation: in which respect it is opposed to *crisis* ipasms, or convulsions, where the contractions and relaxations alternate in rapid succession. (See Convulsion and Sparix.) The powers of sensation and of intellect remain unimpaired in tetanus; in which respect also it is contrasted with epilepsy.

Tetanus admits of many varieties and modifications, on which the older nomenclature had founded different species of the disease. A rigidity of the muscles of the lower jaw was denominated *trismus*. When the muscles of the back were chiefly affected, the disease was termed *opisthotonos*: when those of the fore-part of the trunk, with the flexors of the extremities, were the seat of ipasms, it was called *emprophibias*. Sometimes, though very rarely, the ipasms are confined to one side of the body only, bending it strongly to that side; a form of the disease which has been named by Sauvages *tetanus lateralis*, and by later writers, the *pleuriphtotonos*, or *pleuriphtotonos*. It was only when the ipasm was almost universal, that it was considered as entitled to the appellation of *tetanus*. Of late years, however, these names have very properly been considered as expressing only varieties of one and the same affection, differing merely in severity, but arising from the same causes, and requiring the same mode of treatment.

These various forms of ipasms often follow one another in succession in the same case, and mark the progress of the disease through its different stages. Thus the *trismus*, or locked jaw, is only a part or prelude of *opisthotonos* and *tetanus*; and though it may prove fatal at this early period, the imperfect form in which the symptoms of a disease, which has been thus arrested in its course, may appear, is by no means sufficient to establish a generic difference in the disease itself. There appears, however, to be some foundation for a division of cases, according to their duration, into the acute and the protracted: the former being very little under the control of medicine, and in almost every instance fatal; the latter being milder in its character, and often yielding, if proper means are employed for its subjugation.

Another ground of distinction among the different cases of this formidable disorder, is derived from the nature of the causes from which they have originated. The most usual causes are certain mechanical injuries to the body, more especially such as are attended with a puncture or laceration of a nerve: on other occasions, it may be the effect of the sudden application of cold, when the body has been previously overheated; and, in a few instances, it has appeared to arise spontaneously; that is, when it could not be traced to any external exciting cause whatever. Tetanus arising from wounds is, in general, slower in its progress than that which proceeds from cold; but is attended with more danger to life.

On some occasions the disease comes on suddenly, and with great violence; but more commonly the attack is gradual. It is often eight or ten days, and sometimes much longer, after the infliction of a wound, before the first symptoms of tetanus make their appearance; and this frequently happens when the effects of the injury on the part itself appear to have subsided; when the wound has healed, and no pain or uneasiness has remained. Those cases in which the disease is more flow in its approach, afford the best opportunity of tracing the natural succession of symptoms; and the first uneasy sensation which is then observed, is that of a slight stiffness in the back part of the neck and about the shoulders, which, gradually increasing, impede the rotary motions of the head, and also its flexion forwards: so that the patient cannot look downwards, or to either side, without turning his whole body. This uneasy feeling, being chiefly felt on motion, very much resembles what occurs from rheumatism, but it is accompanied with a sense of general latitude and debility. The rigidity now extends from the back of the neck to the muscles of the jaw, and of the root of the tongue, so that both mastication and swallowing become difficult and painful; and at length impossible. The attempt at deglutition is attended with convulsive efforts; especially when liquids are endeavoured to be swallowed. So great is the distress which accompanies these convulsions, that the patient becomes very reluctant to renew the trials, and refutes all nourishment; and it sometimes inspires him with even a dread of the sight of water.

As the disease advances, another set of symptoms appears, bringing
TETANUS.

bringing with them a considerable increase to the sufferings of the patient. A sudden and violent pain is felt shooting from the lower extremity of the sternum to the spine, in the situation of the diaphragm. These spasms recur from time to time, at short intervals; and at each recurrence, give the signal for an immediate aggravation of all the other spasms. The muscles of the neck and jaw are immediately called into violent action; the head is pulled strongly backwards; and the jaw becomes firmly clenched. These periodical accessions of spasm become more severe, and their effects more durable; so that the head continues to be in a state of retraction, and the jaw is permanently closed, the teeth being so firmly set together, as not to admit of the smallest opening. Such constitutes what may be regarded as the first stage of the disease; which sometimes takes up three or four days. At other times the disease establishes itself, with its whole train of dreadful symptoms, in a few hours; in which case the danger is imminent; as death generally takes place in from twenty-four to forty-eight hours, and the patient very rarely paffes over the third day.

The continuance of the disease, if the patient survive the immediate attack, is marked by the increasing spasm of the diaphragm, which now returns every ten or fifteen minutes, and is instantly succeeded by a stronger retraction of the head, and rigidity of the muscles extending down the back, along the spine, and affecting even those of the lower extremities. Their contractions increasing in force, the body is frequently raised in the form of a bow, reiting upon the head and feet alone: a state which is more particularly designated asphylotos. The countenance, as is observed by Dr. Chalmers, is pale and contracted; the mafioid, coraco-hyoid, and sternohyoid muscles, together with the others concerned in declination, and the deltoid and pectoral muscles, are most violently contracted, so that the shoulders are strongly raised forwards, and the arms are stretched out, or drawn across the body; but the wrists and fingers seem not to be affected. In a few seconds, a remission takes place; the shouldets and arms recline, and the inferior extremities relax; yet not fo entirely, but that generally such a degree of rigidity continues, as to prevent their being bent, even when this is attempted by another perfon. The muscles on the sides and fore part of the neck continue still contracted, although not so strongly; but their action is overcome by the number and strength of the posterior ones; so that the contraction of the head constantly remains. The patient breathes quick for some minutes, as if he had been excessively exercised, and the pulse is small, fluttering, and irregular, but both become more calm and slow. The face is sometimes pale in the intervals, but oftener flushed; and the whole countenance expresses strong appearances of the most melancholy ditibilities; as well on account of the terror the patient feels at the approaching paroxysm, as from the torture he has suffered from the last, of which the painful contractions he still feels perpetually remind him. He, for the most part, desires to lie still as much as possible, and to avoid all attempts at drinking, speaking, or any kind of motion; all of which are apt to occasion a return of the spasm in all its horrors. Some, indeed, are solicitous to try a change of position, in hopes of obtaining one of greater ease; but the act of turning the patient never fails to bring on an attack of the convulsion, by which the head is drawn back to the spine; and it is at length found, that the best means of avoiding this is for him to lie perfectly still on the back.

It may, in general, be observed, that the extensor muscles are affected with spasm before the flexors. In the lower extremities, indeed, both the flexor and extenor muscles are commonly at the same time affected, and keep the limbs rigidly extended. The flexors of the head, and the muscles that pull down the lower jaw, become affected in the progress of the disease, together with the abdominal muscles; so that the belly is strongly retracted, and feels hard, like a piece of board. The spasm of these and the other flexor muscles, becoming so powerful as to balance the action of the extensors, is a circumstance that marks the advance of the disease, and may be regarded as constituting the commencement of a third stage. In this situation the body and limbs are perfectly straight and rigid, and incapable of being moved in any way; and it is to this condition that the term tétanust has been more especially applied. It is a state of the most exquisite suffering: the patient is on the rack from the continual recurrence of the spasm, which has scarcely any remission. The recti muscles of the abdomen often contract unequally, producing the appearance of hard balls in particular parts. The whole belly is drawn inwards, and does not yield in the least to the defeat of the diaphragm in inspiration. Although the lower extremities are always rigid at this period, yet their action is so violent during the height of the paroxysms, that were it not for the flanders by, the patient would be projected feet foremost off the bed; or would, at other times, be pushed upwards with such an impetus, as to strike the head with great force against whatever might happen to be in the way. Occasionally, the flexor muscles acquire the preponderance over the extensors, and the trunk of the body is bent forwards, the chin being fixed to the breast. This is what has been called emprosthotonos, and occurs only in the most violent, and of course the least frequent form of the disease. It would appear from some cases reported by Sauvages, that these opposite states are disposed to alternate with one another.

In extreme cases, there are hardly any of the voluntary muscles that remain in their natural state. The face and eyes are distorted; the tongue is suddenly darted out between the teeth, and often miserably lacerated from their closing at the same moment. Even the small muscles of the ear partake of the spasmatic action, which so universally prevails in the system. While the tongue is thrust out, the muscular flesh, which is situated between the arch of the lower jaw, and the upper part of the trachea, is drawn upwards within the throat. The countenance is much contracted; a general sweat breaks out; the eyes are watery and languid; and a pale or bloody froth bubbles out between the lips. Tétanust in these violent forms, is, perhaps, the most painful disease that can affect the human frame. So exquisite a degree of pain would scarcely be compatible with life, were it not occasionally assuaged by the short and imperfect remissions of spasm which occur. A more continued and severe spasm, or a general convulsion, generally finishes the tragedy, and releases the unhappy victim from all his misery; or, if already too exhausted by the severity of pain to admit of this mode of termination, delirium often ensues, protects the patient by a happy insensibility to further suffering, and smooths the avenue to death, which is then preceded by a general relaxation of the spasms.

Such are the symptoms which peculiarly belong to tétanust, and it is, perhaps, the most remarkable circumstance attending the disease, that hardly any function is primarily affected, except that of muscular action. The senses and appetites are perfect and entire; the intellectual functions are undisturbed; and the natural functions proceed in their usual course. Fever is neither an essential nor a common attendant on the disease. In the first stage, when the spasm is confined to a few muscles, the pulse is not affected; it becomes accelerated only when the spasmic actions are general,
general, and this merely in consequence, as it would appear, of the mechanical effect produced on the blood-vessels by the contractions of the muscles, which will hurry on the circulation, and throw the blood upon the heart in larger quantity than usual, rendering the pulse contracted, frequent, and irregular. The respiration is hurried from the same cause, and the temperature of the body, as might be expected, is increased in the same proportion. That these symptoms are not the effect of fever, appears from the state of the blood, which is flated to be of a rougher texture than natural, and never exhibits the bufly coat, as in inflammatory disease. This circumstance is particularly noticed by Dr. Clephane, and also by Dr. Chalmers; and the remark has often been verified by subsequent observers. On some occasions, indeed, when the disorder is very violent, the arterial actions are increased, and a febile state prevails; and this appears to take place more frequently when the disease has originated from cold, than when it has been excited by wounds. The skin is at first natural, but, as the disease advances, is covered with a cold sweat. The tongue is always moist. Vomiting sometimes takes place early in the complaint, but it commonly subsides in the progress of it: it is even usual for the appetite of hunger to remain through the whole course of the disease; and what food can be got down appears to be sufficiently well digested. Some local effects seem to be attributable to the contractions of the abdominal muscles. The sphincter of the bladder is occasionally affected with spasm, so as to impede the discharge of urine, which is voided with pain and difficulty; at other times, its secretion is suppressed. When it can be observed, it is flated as being high-coloured, and somewhat turbid. The bowels are found to be, in every instance, obstinately coltive, a flate which may partly be accounted for by the effect of opiate, which are so generally administered for the cure: but which, independently of this cause, appears to be inherent in the disease itself. The bowels require the most drastic purgatives; and there is a great fene of uneasiness about the precordia. In the latter stages of this disorder, indeed, when the powers of life begin to decline from the vast expenditure of energy occasioned by the violent muscular actions, every function in the sytem partakes of the general disorder; the intellect gives way, and the patient sinks from exhaustion alone, if a general convulsion does not occur to hasten his end. It is mentioned by Dr. Cullen, that, in several cases, a military eruption has appeared upon the skin; but he expresses a doubt whether this was a symptom of the disease, or the effect of a certain treatment of it. It has not been observed, he adds, to denote either safety or danger, or to have any effect in changing the course of the distemper.

From the more violent forms of the disease, hardly any instance of recovery has been known to take place. On the other hand, the more protraction of the symptoms is an indication of the comparative mildness of the disease. Few patients fall a sacrifice after the ninth or tenth days, which period they never could have attained, unless the violence of the complaint had in a great measure subsided. In this milder form, however, it may be prolonged several weeks; and sometimes the spasmodic disposition remains, even for months, before health is completely restored. The pulse, in these cases, continues slow and hard, and the belly bound: but if blood be drawn, it does not exhibit any difference from its usual state. Under every circumstance of recovery, indeed, the convulsive labours long under general debility, and cannot, for months, raise himself from a supine or recumbent posture without assistance, nor without pain.

Occasional deviations from the course above described are met with in different cases; but they are not of sufficient importance to lay the foundation of any distinct variety. The most singular of these anomalies is the one recorded by Dr. (now Sir Gilbert) Blane, of a case in which tetanus prevailed to a very considerable extent, without affecting the patient with the least degree of pain. The spasms were, in this instance, accompanied with a tingling sensation, which was even rather agreeable than distressing. The case, however, terminated fatally: but to the latt, no pain was experienced. In two cases mentioned by the same author, the spasms affected only the side of the body in which the wound was situated.

The result of dissections of patients who have died of tetanus, has thrown no light whatever on the nature of this terrible affection. Sometimes there are found slight effusions within the cranium; but, in general, no morbid appearance whatever can be detected in the head. There appears to be always more or less of an inflammatory appearance in the villous coat about the esophagus and stomatch in the neighbourhood of the cardia. But those who are conversant with dissections, must be well aware that these appearances are common to a great number of discesses, and are uniformly met with in every case of rapid or violent death. Besides the redness and increased vascularity of these parts, M. Larrey flates that he found the pharynx and esophagus much contracted, and covered with a viscid reddish mucus. Dr. MaArthur found, in several cases, the interlines much inflamed; and in two of them a yellow waxy fluid, of a peculiar offensive smell, covering their internal surface: but whether the inflammation was primary, or only a consequence of the pressure of the abdominal muscles, which contract so violently in this disease, he is unable to decide. See Medico-Chirurgical Transactions, vol. vii. p. 475.

Tetanus is a disease much more prevalent in hot than in cold climates. It is comparatively a rare disease in this island; but even here, the effect of warmth in giving a predisposition to it is sufficiently observable. It is more common in the south than in the north of England, and is much more seldom met with in Scotland than in England. It is febibly more frequent in warm than in cold leasons. In warm, and especially in tropical climates, it may be regarded as an endemic disease, appearing at all seasons, but especially during the prevalence of the greatest heats. Warmth operates by increasing the mobility of the sytem, while at the same time it tends to diminish the positive strength of the fibre. The febility to all impressions is greater in hot climates, while the power of resisting the caufe of injury is lessened: hence the greater predisposition to spasmodic difcases in general. The natives of hot climates do not enjoy a greater exemption from tetanus than European settlers. Negro slaves are peculiarly liable to its attacks. It affects all ages, sexes, constitutions, and complexion: but, ceteris paribus, is more apt to feize upon those in whom the largest share of vital power has been bestowed upon the muscles of voluntary motion. Hence it attacks more readily the robust, and those who are accustomed to much bodily labour. Partly on this account, and partly from their being more exposed to the occasional causes of the disease, men are much more frequently the subjects of tetanus than women.

In the torrid zone, the most frequent exciting cause of tetanus is the application of cold when the body is heated. It is often induced by the alternate exposure to the scorching heat of the sun, and to the heavy showers which frequently occur in tropical regions, and produce great and sudden vicissitudes of temperature. Sleeping out of doors after a hot day, especially on damp ground, or in a situation where a stream of cool air is admitted to the body, is often followed by tetanus in hot climates. Dr. Chalmers relates that a young man chose to cut off his hair and shave his head on a warm
warm day in March, and went to bed without a cap: but
the weather changing and becoming cold in the night, he
was feizd with tetanus, and the next morning was found
rigid with the difcase. The imprudent ufe of the cold
bath, or even a draught of cold water, when the body has
been warm by exercife, has frequently brought on tetanus.

In temperate climates, on the other hand, the difcane
feldom aries from the application of cold; although there
is one well-atteiled infance mentioned by Dr. Gregory in
his lectures, of its occurring from this caufe in Scotland:
but it is more frequently the confequence of lacerated or
punctured wounds, and is particularly incident to injuries of
nerves, and of tendinous parts. It fometimes follows the
amputation of a limb; and it would appear that wounds of
the joints, particularly thofe of the hands or feet, are
more pefcicably liable to produce tetanus. In warm
countries, the flighted cut or bruife is in danger of being
fucceeded by this formidable malady. Hence few of thoje
that are wounded in battle recover; and few perforve any
considerable operation. It has been fuppofed by many, that
tetanus arofe from the partial division of fome nervous fibres,
in confequence of which the undivided fmalaments were
unequally and violently flrecthed: a flate which would be
remedied by their complete division. Experience, however,
the flubborn enemy to fo many hypothehes, has by no means
proved favourable to this opinion. It has alfo been flated
to be more frequently the refult of wounds, which remain
in a fiate of great irritability, without proceeding to fup-""
TETANUS.

secure the patient from the approach of tetanus. But the difficulty is here to estimate the probability of the patient's having the disease, as nothing short of the certainty of its being at hand, could well justify the operation.

As it is matter of experience that an early and highly irritable and painful condition of the wound has a tendency to excite tetanus, as well as a state in which the discharge is of a peculiar unhealthy character, or is suppressed altogether, our immediate objects should be to allay as much as possible the local irritation, and to re-establish a healthy secretion of pus. Mechanical causes of irritation should as much as possible be obviated, by early attention to remove splinters of bone, balls, or other foreign bodies, that may be lodged in the wound. Poultices and soothing applications will answer the double purpose of quieting local inflammation, and bringing on healthy suppuration. The irritability of the surface may sometimes be most effectually destroyed by lunar caustic, after which, an emollient poultice may be applied. An opposite plan of treatment has been recommended by Dr. Ruh, namely, that of exciting considerable inflammation in the wounded part, by epithems of turpentine, and other highly stimulating applications; which, though it may in certain cases have succeeded in preventing tetanus, does not appear to be generally applicable, and seems accordingly to have been abandoned. On the contrary, it has of late been the universal practice in the navy, to add tincture of opium to the dressings applied to wounds, with a view of preventing tetanus. With the intention of re-exciting suppuration where there is no discharge, M. Larrey recommends the application of blisters as near as possible to the wound, and addsuces influences of succussion from this mode of treatment.

But the cure of tetanus, when once it has commenced, is to be fought for more by the use of general, than of topical remedies. The feat of the disorder has been transferred to the brain and nervous system, and our efforts must be directed to allay their inordinate actions. The plan from which theory would lead us to expect most successe, is that of exciting some new action in these organs, by which their energies would be directed into some different channel, and the existing morbid action would be suspended and superseded. The remedies which exert the most powerful immediate effects in the nervous system, are accordingly found to be the most efficacious in the cure of tetanus. Opium, wine, and other highly diffusible stimulants, digitalis and other narcotics, the sudden affusion of cold water, bleeding, purging, impregnating the system with mercury, the exhibition of arsine, of oil of turpentine, of alkalis, and of ipecacuanha, have respectively been resorted to, and with very various, and in general but limited success. The same methods from which cures have been obtained in the milder cases, generally fail to make the least impression on the disease in its feverish forms. We learn from the valuable report of Sir James Maclagan, already alluded to, that there were very few, out of several hundred cases that occurred in the British armies during the late campaigns on the Peninsula, where this difease had made any progress, in which it terminated successfully, or in which remedies, however varied, seemed to have any beneficial influence.

Opium is the remedy on which reliance has most generally been placed in combating this formidable disease; and there is no doubt that in mild cases it is competent to its complete solution. But for this purpose, it is absolutely necessary that its use be begun from the earliest appearance of the symptoms; that it be given in very large doses; and that the doses be repeated at short intervals: so that the fever be kept constantly under the influence of the remedy. It is, indeed, almonifying how the fynlem, when posseffed by a strong disposition to fpaflms, will refit the operation of this and other remedies, which in its ordinary state would have been more than sufficient to overpower and destroy it. Patients labouring under tetanus will bear with impunity quantities of opium, that at any other time would have been certainly fatal. Inflances are upon record of five, ten, and even twenty grains, being taken every two or three hours for many days, without its producing any extraordinary narcotic effects upon the fenedium. It is always, however, advisable to begin with comparatively moderate doses, such as forty or sixty drops of tincture of opium, which may be repeated at intervals of three or four hours, and increased at each repetition, till some sensible effect is produced upon the fpaflms. It seems requisite to augment the dose rapidly, as the disease presses upon us every hour, and no time is to be lost in refilling its advances, while there is yet a chance of controlling its fury. The circumstance of the closing of the jaw, and the difficulty of deglutition, the increafe of which may soon render it hardly possible to introduce medicines into the fonamach, is an additional motive urging us to push our remedies before those obfacles arise. Glyaffers are our only refource, when it is impossible to overcome the fpaflms of the fauces. Opium has also been applied externally and topically to the jaws; and relief has sometimes been obtained from an opiate plaster on the maffeter muscles, or behind the ears; but these are comparatively very trifling in their efficacy, and applicable only to the slightest cafes, or to those in which convulsions are still affected with a recurrence of one or two local symptoms.

It is of the greatest importance in all cafes of tetanus, and more especially where opium is given, to excite a proper action of the bowels, so as to allow of no stagnation of their contents. The testimony of the army physicians, as appears from the report of Sir James Maclagan, is highly in favour of a rigid perfeverence in the use of purgatives, given in doses to produce a full effect daily. Dr. Forbes states, that a solution of sulphate of magnesia, in infusion of fenna, was found to answer better than any other purgative, and it was daily given in a sufficient quantity to procure a copious evacuation, which was always dark-coloured, and highly offensive; and to this practice he chiefly attributes, in one severe cafe, the removal of the disease. The infrequency of locked jaw in the West Indies, in the public service, of late years, is chiefly ascribed by Dr. Dickson, to the greater freedom with which purgatives have been employed, particularly since the publication of Dr. Hamilton's work on the operation of this clafs of remedies; an opinion which is corroborated by the testimony of various authors, as to the value of obtinate cellivese which prevails in this disease, and the offensive nature of the contents of the intestines.

For the introduction of the stimulant and tonic plan of treatment, we are chiefly indebted to Dr. Ruh, who was led to adopt it from some theoretical views he entertained on the nature of tetanus, which he conceived to be essentially a disease of debility. There can be no doubt that in many cases the exhibition of wine or spirits has been attended with very good effects. Dr. Hofmann, in vol. iii. of the American Medical Repository, relates several cases which were cured by large quantities of wine.

A free allowance of wine and porter after gun-shot wounds has appeared also, according to the statement of Dr. M‘Arthur, to have contributed to the very small number of cafes of tetanus which occurred under his care in the hospital at Barbadoes, during nearly six years of the most active period of the war. Of the numerous cafes of gun-shot wounds received into the hospital, and of operations performed, during the whole
whole of that period, only two instances of tetanus occurred. Bark has been given in conjunction with wine and opium; and the purified tincture of iron has also been used with apparent advantage. The success of the tonic plan of treatment rests also on the testimonies of Dr. Wright of Jamaica, Dr. Cochrane of Nevis, and several other West Indian practitioners; and also on that of Dr. Currie of Liverpool.

The preference of an inflammatory diathesis, which occasionally accompanies the spasmodic flatus, presents, however, a material obstacle to the employment of the above-mentioned remedies. So much is this the case that many physicians have recommended the free use of the lancet, particularly in the early stages of tetanus. Dr. Dickson states it as his opinion, that in a full habit, where the wound is swelled, inflamed, and painful, venesection, with free purging, and such other means as are calculated to alay the general and local irritation, afford the fairest chance of averting the danger. (See the 7th volume of the Medico-Chirurgical Transactions, part 2.) In the 6th volume of the same work, a case is detailed by Mr. Earle, in which, though it terminated fatally, bleeding was beneficial, and lessened the patient's sufferings; and in the same volume, it is also mentioned with approbation by the medical officers in the Peninsula. Dr. M'Arthur considers that he used blood-letting with evident relief in one case, in the naval hospital at Barbadoes; that the spasms were ameliorated, the dilatation protracted, and the morbid appearances after death were less marked in consequence. Mr. Larrey also adduces some examples where it produced a good effect. Mr. Guthrie gives three cases which occurred in the hospitals of St. Andro, out of many which were recorded, where venesection was the principal remedy. In the first, in which tetanus from a wound in the hand was advancing with rapidity, the patient was bled ad delinquum several times with good effect, calomel and diaphoretics being given at the same time, and he recovered. In the second case, the patient was bled in the same manner, with an evident amendment of the symptoms; so much so, indeed, that he suffered but little from spasm, and could open his mouth very well, when he was feigned with diarrhoea, which, in the debilitated state he was in, carried him off. In the third case, of a man of a fanguineous temperament, and suffering from acute tetanus, venesection pulled to the utmost totally failed.

Digitalis has been tried in the Peninsula in several cases, occasionally with good effect, though it never appears to have effected a cure. Ether, camphor, mustard, and other antispasmodics, as likewise the alkalies, were also tried, and found equally unsuccessful. Coffin strongly recommended by Arataeus, but is too feeble a remedy to have any decisive influence in so violent a disorder.

The affusion of cold water has in general been attended with great benefit. It is a practice particularly recommended by Dr. Wright, in the London Medical Observations, and is sanctioned by the concurring testimonies of Dr. Cochrane, in the Medical Commentaries, and of Dr. Currie, in his Medical Reports, &c. as well as by many other practitioners. A large pailful of cold water should be thrown upon the patient every two or three hours; he is to be immediately wiped dry, and laid in bed after each affusion, and an opiate draught administered. Some renovation of the spasms will in this way be generally obtained; and many instances are upon record, of complete cures being effected by perseverance in this plan. Before the introduction of this practice, the warm bath was very commonly employed; the patient, after using it, being placed in bed, without being dried, between two blankets, with a view to bring out a sweat. It does not appear, however, that this plan was attended with any general or permanent advantage; and is certainly inferior in efficacy to the cold affusion. The cold bath, says Sir James Macgrigor, in acute tetanus, is worse than useless. The use of a hot bath impregnated with potash, and a few ounces of quicklime, has been much recommended by Dr. Stutz of Suabia in traumatic tetanus. See Medical and Physical Journal, vol. iii.

The powerful relaxing effects of tobacco given in glyster in cases of hernia and enteritis, have suggested its employment in tetanus. Mr. Earle tried it in one very acute case, in which, although it afforded a temporary alleviation from spasms, so much agitation was produced by it, that it was not persevered in. He is, however, induced to recommend the trial of a suppository made of the extract of nicotine, and passed up into the rectum. But, according to the report of Sir James Macgrigor, tobacco glysters, tried in the advanced stage of the disease, seemed to have no effect. He represents, however, the tobacco fume as deserving of further trial. A remarkable case is recorded by Dr. Phillips, in the 6th volume of the Medico-Chirurgical Transactions, in which the jaw suddenly fell, upon the exhibition of an esca with oil of turpentine.

It has been supposed that mercury thrown quickly into the fyrum, in order to excite salivation, would prove highly serviceable in relieving the spasms, and particularly those of the muscles of the jaw. This practice was first introduced by the practitioners in the West Indies, and in particular by Drs. D. and A. Monro, and appears to have succeeded in many cases. Dr. Ruth conceives that its salutary effect is connected with its inducing in the fyrum a state of inflammation incompatible with the spasmodic action, which it would therefore supereede. Whatever benefit, however, may have been experienced from this plan in mild cases, it completely fails in the more severe of making any impression on the disease. Dr. Emery, Mr. Guthrie, and other medical officers attached to our army in the Peninsula, after the battle of Salamanca, tried inunction of the whole body three times a day, with strong mercurial ointment, in unlimited quantity, with no degree of success. Mr. Guthrie reports, that after the battle of Touloufe, a fatal case occurred in a man strongly under the influence of mercury, which he had used previously to the action for the cure of the itch. The combination of calomel with ipecacuanha, which has been much recommended, is equaly ineffectual with the other remedies, in the acute and fully formed disease. In the mild tetanus, benefit has been derived from calomel; and its operation on the bowels is always useful, and regularly, in the mild disease distinguished by the spasms coming on slowly, and continuing of the same violence; instead of their sudden accession, and their continuing with increasing violence, as happens in the acute fully formed tetanus. In this, calomel cannot be depended upon, as the patient is carried off before the medicine can have any effect.

Several remedies were formerly in vogue, of which it is hardly necessary to give any account, as they have now lost all the credit they once enjoyed. It may be sufficient to mention the Barbadoes tar, alluded to by Dr. Cullen; the colchicum, the olive, or meadow saffron, recommended by Dufrefnoy; blisters, electricity, cataplasms, applications, full incisions, &c. most of which appear either to be inert, or at best very weak auxiliaries to the remedies already described.

Of late years, tetanus has been much less frequent in the West Indies, when compared with former wars. This is attributed, apparently with great reason, by Dr. Dickson, to the improvements in the medical and surgical treatment of wounds; to greater cleanliness, and more perfect ventilation; and in general to superior comforts, diet, and accommo-
TETARBOLION, in Ancient Coinage, the quarter-draechm, or, being of 24 grains, and its current worth a farthing and a half.

TETARMIUM, in Ancient Geography, a town of Asia, situated in that part of Lydiaea, which Ptolemy comprehends in Galatia.

TETARTEMORION, among the Ancients, denotes the fourth part of the zodiac.

TETARTO-CHRUSOS, χρυσο-χρυσος, in Ancient Coinage, a gold coin of Philip, Alexander, and Lysimachus, which was a quarter of the Egyptians or χρυσος; it weighs 33 grains, and paid for 5 drachmas of silver, 37. 94., now worth intrinsically 57.

TETAVI, in Geography, a town of the principality of Georgia, in the province of Caket.

TETBURY, or Tetbury, anciently Teteburis, a large and respectable market-town in the hundred of Longtree, and county of Gloucester, England, is situated 20 miles S. by E. from Gloucester, and 99 miles W. by N. from London. Its name evidently determines it to have been a military station. On the S. E. side, within the memory of many living, were traces of a strong camp, now completely destroyed, where arrows and javelin-heads have been found, with various English coins of high antiquity. Roman coins of the Lower Empire have likewise been met with in and near the town. Tetbury consists principally of four streets, crossing in the centre, and contains many good stone buildings. The governing officer is a bailiff, who is annually chosen. The population of the parish, including four hamlets, in the year 1811, was 2533; the number of houses 522. A weekly market is held on Wednesday, and four fairs annually. The woollen-combing and wool-lapping branches are carried on here, but to no great extent. The clothing manufacture was formerly attempted, but the want of a continual supply of water prevented its being brought to perfection. Even for domestic uses, water has, till within a few years, been scarce; but in 1749, a well was sunk to the depth of 104 feet, since which time other wells have been opened, and the inconvenience in a great degree removed. The parish church consists of an ancient tower, and a modern body; the former is terminated by a spire, the latter is built in imitation of the pointed style, appearing externally as a single nave with cloisters, but within sub-divided into aisles, by a very light arcade and clustered columns, on the principle on which the roof of the theatre at Oxford was constructed. The old church, which was built soon after the Conquest, having become from length of time very ruinous, was taken down (excepting the tower and spire), and rebuilt at the expense of 5000l.; and opened for divine service in 1784. Two turnpike roads lead through the town in crofs directions; one to London and Bath, the other to Gloucester and Southampton. A deep hollow, in the nature of a moat, at the well end, made the entrance into the town inconvenient, till the commissioners of the roads built a high bridge of four arches across it in 1775. Rudge's History of Gloucester, vol. i. 1803. Beauties of England and Wales, vol. v. Gloucestershire; by J. Britton and E. W. Brayley, 1803.

TETCHA, a small river of Russia, which runs into the Ifet, near Dolmatov, in the province of Ekaterville.

TE-CHUEN, a town of Corea; 60 miles E.N.E. of Han-tehou.

TETE, a fort belonging to the Portugueze, in the country of Mocuranga, on the Zambec.

TETE de Bouch, La, a town of France, in the department of the Gironde, situated on the S. side of a large bay, called "The Harbour of Arcachon," the entrance of which is dangerous on account of the sand-banks; 30 miles S.W. of Bordeaux.

TETEROA, a harbour on the W. coast of the island of Ulieta.

TETEROV, a town of the duchy of Mecklenburg; 18 miles S.W. of Giltro.

TEETERSKOI, a town of Russia, on the Podkamenka, 44 miles W. of Podkamensk.

TETHALASSOMENOS, a term used by the old medical writers, to express wine mixed with sea-water.

TETHEH, in Geography, the daughter of Celum and Terra, and wife of Oceanus. Her chariot, which is represented as gliding over the surface of the waters, was a shell of an extraordinary figure, and whiter than ivory.

TETIUS, in Zoology, a genus of the Molluca order of Vermes, or worms; the characters of which are, that the body is free, somewhat oblong, glairy, and having no peduncles; the mouth terminating in a cylindrical proboscis, under the lip; and two foramina on the left side of the neck. It has two species:

1. LEPORUS. With a ciliated lip; found in the Mediterranean sea.

2. FIMBRICA. With a crenulated lip; found in the Adriatic sea.

TETIMIXIRA, in Ichthyology, the name of an American fish, more usually known by the name of Tympano.

TETIN, in Geography, a town of Bohemia, in the circle of Beraun; 3 miles S. of Beraun.

TETITLAN, a town of Mexico, in the province of Xalifico; 18 miles S.E. of Compotello.

TETIUS, in Ancient Geography, a river of the isle of Cyprus, which ran from the N.W. to the S.E. and discharged itself into the sea, near the promontory of Dades, after having watered Citium.

TETIUSCHI, in Geography, a town of Russia, in the government of Kazan, on the Volog; 52 miles S. of Kazan.

TETOB, a town of the state of Georgia; 5 miles W. of Tugeloo.

TETRACERCA, in Botany, received that name from Linnaeus, in allusion to the four horn-like points of the capsules of the original species, the word being compounded of τετρα-, four-fold, and κερας, a horn. The genus however has subsequently received an accesion of several species with follicular capsules and styles, which invalidate the strict propriety of its name, and render its situation in the artificial system of Linnaeus ambiguous.—Linn. Gen. 275. Schreb. 369. Wildl. Sp. Pl. v. 2. 1240. Mart. Mill. Dict. v. 4. Julii. 339. Lamarck Hist. t. 485. Gernt. t. 69. (Delima; Linn. Gen.
TETRACERA.


Gen. Ch. Cal. Perianth inferior, of one leaf, in five or six deep, rounded, unequal segments, permanent. Cor. Petals from three to five, roundish, concave, inserted into the calyx, and longer than its segments. Stam. Filaments numerous, inserted into the calyx, shorter than the petals; anthers of two round lobes. Fil. Germs superior, from one to three or four, ovate, quite distinct; Styles vertical, awl-shaped; Stigmas obtuse. Peric. Capsules from one to three or four, ovate, divaricated, each of one valve, burr-like along the upper edge, of one cell. Seeds solitary, roundish, attached to the bottom of the capsule, and clothed with a jagged tunic from the bafe.

Eff. Ch. Calyx in five or six deep unequal segments. Petals four or five. Capsules burr-like at their upper edge. Seeds solitary, tunicate.

Obs. The capsules resemble follicles, but the seed is attached to their bafe.

Section 1. Flowers with a solitary genrum and style.


2. T. tumenofici. Downy Tetracera. Willd. n. 2. (Tigarea dentata; Aubl. Guian. 920. t. 335.) — Leaves elliptical, pointed, with tooth-like serratures; smooth above; downy beneath. Flowers dioecious. Style solitary. — Native of woods in Cayenne, flowering in January, and ripening its seed in March. The trailing burr-like branched stem climbs to the tops of the highest trees, from whence its pendulous branches reach almost to the ground. The young leaves are downy. Leaves alternate, stalked, four or five inches long, and two or more in breadth; their upper surface smooth and green; the under silky and hoary. The flowers and fruit agree with the following.

3. T. altera. Harsh Tetracera. Willd. n. 3. (Tigarea altera; Aubl. Guian. 918. t. 350.) — Leaves roundish, somewhat undulated, rough. Flowers dioecious. Style solitary. — Frequent in the woods of Cayenne, bearing flowers and fruit in January. Aublet says it is sometimes so abundant as to render the forests impassable, from the entanglement of its stems and branches, which climb to the tops of trees, and hang from thence to the ground. Their roughness, like that of the leaves, renders them the more troublesome and dangerous. The French call this shrub Liane rouge, or red climber, from the colour of its decoration, which the natives of the country consider as a remedy for venereal disorders. The leaves are alternate, stalked, of a broad elliptical, or roundish, figure, obtuse, slightly wavy at the margin, rough on both sides with rigid, crooked, hoary hairs. Their ribs and veins like those of the first species. The largest leaves are three inches and a half long, and three broad. Flowers in axillary panicles, male on one plant, female on another. Calyx in four or five concave, pointed segments. Petals four or five, white. Stamens numerous, short. Anthers yellow, their two lobes separated by a furrow. Pilif. abortive in the male flowers, as the flumosa are without anthers in the female, whose germen is roundish, with one style, and a broad blunt stigma. Capsule solitary, reddish, rough to the touch, containing one seed. Aublet.


Willdenow has four more species in this section, of which his T. Dollicarpus, fruta, and Calinea, will be found under our article Dollicarpus; and his T. obovata is our Mapa.

Sec. 2. Flowers with three or four germs and styles.


6. T. volubilis. Serrated Rough Tetracera. Linn. Sp. Pl. 751. Hort. Chiff. 214. Willd. n. 10. (Arbor americana convolvulaca, Broad leaf, i. e. platypillos barbadenus dicta, foliis ferratis; Plak. Phyti. i. 146. t. 1.) — Leaves obovate-oblong, ferrated, very harsh. Styles four. Calyx silky within. — Native of the West Indies. The branches are round, with a rough, dotted, membranous, deciduous bark. Leaves alternate, stalked, five or six inches long, and two and a half or three wide, obtuse, very rough, like a file, with minute scales, especially beneath; each lateral rib, at leaf in the upper half of the leaf, terminating in a sharp but shallow ferrature. Panicles terminal, compound, rough with hairy scales. Calyx harsh and hoary externally; bristly and silky within. Capsules unequal, ovate, tumid, beaked, brown, smooth and highly pubescent; rounded, not deprered or keeled, at the sides. Seed small, black, in a pale, finely lacinated, tunic.

7. T. rotundifolia. Round-leaved Tetracera. — Leaves roundish-elliptical, entire, very harsh on both sides. Styles four. Calyx smooth within. — Native of Guiana. We have received specimens of this new species from Mr. Rudge and Mr. Forrer, under the name of Tigarea altera of Aublet, our Tetracera altera, see n. 3, which, unless that author has made several great mistakes, must be a very different plant. The present has always three or four styles, and as many capsules; and the leaves, though like Aublet's t. 350. in shape, are quite entire, not undulated. They are harsh on both sides, like a very fine file, as is the branch in a leaf's degree. The panicles are terminal. The calyx has a short, intervenently conical, tube, and is hoary externally, smooth and naked within. The flumosa appear to be perfect in the same flower with the four stili. Capsules three or four, oval, brown, smooth and thinning; keeled and deprered at the sides, less tumid than the foregoing. Seed entirely enveloped in its jagged tunic.

inches long, veiny, smooth on both sides; tapering at the base; serrated with a few flight teeth towards the point. 

Flower-tails very short. Flower-tails solitary or in pairs, terminal, an inch long. Flowers somewhat racemose, one or two on each partial stalk. Calyx with six roundish segments. Capsules four, as long as the finger-nail, roundish, smooth, pointed, very smooth and polished. Seed small, black, polished, covered in its lower half with a whitish tunic, whose margin is toothed. 

- Leaves obovate, acute, nearly entire; roughish beneath. 
Panicle terminal.- Native of Guinea. Branches woody, round, smooth. Leaves coriaceous, tapering at the base, rounded at the extremity, with somewhat of a point; mostly entire, but occasionally furnished with an oblong foot or two near the end; veiny; shining and smooth above. Calyx with four deep segments. Petals apparently five. Filaments a little dilated at the end, with an anther (or lobe) at each side. Capsules four. Seed black, entirely covered by its whitish tunic. Panicle simple. Stalks three-flowered. Wild. 

Wilkenow suspects the Alpha indica, of Houttuyn's Dutch edition of the Vegetable System of Linnaeus, v. 4, 40. t. 24. f. 1, may be another species of the genus before us. 

The name tetracera is also inclined to refer Thunberg's Waehbungia, see that article hereafter, to Tetracera.

TETRACHORD, TETRACHORDON, formed of tetra, of terga, four times, and χορν, a chord, or string, in the Ancient Music, was a series of four sounds, of which the extremes, or first and last, constituted a fourth. These extremes were fixed and immutable; the two middle sounds were changeable according to the genera, and called modes. There were three genera or ways of tuning each tetrachord; the diatonic, chromatic, and enharmonic. The character of the diatonic was the tone; of the chromatic, the semitone; and of the enharmonic, the quarter-tone.

A tetrachord in the diatonic genus consisted of one major semitone and two tones.

In the chromatic genus, of two semitones and a minor third.

In the enharmonic genus, of a quarter tone, a semitone, and a major third.

The general system or scale of the Greeks consisted of tetrachords repeated, as the scale of Guido does of octaves. See Greek Music.

The tetrachord of Mercury contained four strings or chords, in the proportion of twelve, nine, eight, and six; so as to give the fourth, fifth, and octave of the lowest chord. This is the opinion of Boethius, and after him of Zarino. Vide Wallis's Append. Ptolem. Harm. p. 178.

TETRACTIS, in Natural History, a name given by Linnaeus, and other authors, to a kind of star-fish, composed only of four rays, the more common kinds having five.

TETRACTYS Arithmetic. See Arithmetic.

TETRACTYS, in the Ancient Geometry. The Pythagorean tetractys is a point, a line, a surface, and a solid.

TETRADECARHOMBIS, in Natural History, the name of a genus of fossils, of the class of the lepidite.

The word is derived from the Greek teta, four, δεκα, ten, and σφαίρα, a sphaeroidal figure, and expresses a sphaeroidal body consisting of fourteen planes.

The characters of this genus are, that the bodies of it are exactly of the same form with the common selenite; but that in these, each of the end planes is divided into two; and there are by this means eight of these planes, instead of four. See Selenites.

TETRADIAPIASON, Quadruple Diapason, a musical chord, otherwise called a quadruple eighth, or nine-and-twentieth. See Diapason.

TETRADITÆ, TETRACITES, in Antiquity, a name given to several different sects of heretics, out of some particular respect they bore to the number four, called in Greek τετρά. Thus the Sabbatians were called tetradites, from their fasting on Easter-day, as on the fourth day, or on Wednesday.

The Manichees, and others, who admitted of a quaternity instead of a Trinity in the Godhead, or four persons in lieu of three, were also called tetradite.

The followers of Petrus Fullenbosi bore the same appellation of tetradite, by reason of the addition they made to the Trifagion, to countenance an error they held, that in our Saviour's passion it was not any particular person of the Godhead, e. gr. the Son that suffered, but the whole Deity.

The ancients also gave the name tetradite to children born under the fourth moon, and these they believed unhappy.

TETRADIUM, in Botany, from τετράδιον, a party of four, as a file of four soldiers, &c. alluding to the prevalence of the number four in its parts of fruitification.—Lonreir. Cochinch. 91.—Clas and order, Tetrandria Tetragyna. Nat. Ord. Tetrandraceae, Juss. or perhaps Rutaceae.


1. T. trichotomum. Gāy dāię dāęů of the Cochincinese. Native of the hills of Cochinchina. A middle-sized tree, with ascending branches. Leaves pinnate, with an odd one; leaflets lanceolate, smooth, entire. Flowers white, in ample, nearly terminal, three-forked clusters; or rather, as we presume, panicles.

De Theis well remarks, that this genus appears to be allied to Brucia: we think also it is evidently very near Fagara (see those articles). In deference to the weighty opinion of Jullieu, we have not, without doubt, referred it to his natural order of Terebinthaceæ; but it appears rather to belong to his imperfectly-defined one of Rutaceæ, to both which articles we refer the reader.

Nothing is said by Loureir respecting the qualities or uses of this tree.

TETRADRACHM, in Ancient Coinage, a silver coin worth four drachmas, or 32. sterling, the drachma being valued at 9d. But if we estimate the value of the drachma at a higher rate, that of the tetradrachm will increase in due proportion. This is the largest form of Greek silver coins, excepting the tetradrachm of the Egnican standard, which is worth 5s. The largest tetradrachms weighed from 430 to 440 grains. See Drachm and Shekel.

TETRADYNAVIA, in Botany, (from τετρά, four, and δύναμις, power, indicating a superiority of four filaments over the reft,) the fifteenth clas of the Linnaean artificial syllem, which
which is in itself, with the exception of one genus, **Cleome**, a natural class, comprehending all the cruciform flowers.

Its essential character consists in having six floral organs, four of which rise above the rest. This is indeed so naturally distinctive a tribe of plants, that it is hard to trace any particular affinity between them and any others. The following is the character of the flowers.

**Cal.** Perianth oblong, of four ovate-oblong, concave, obtuse, converging downwards at their base, the opposite ones most similar to each other, deciduous. The projection generally observable at the base is for the lodgment of honey, the calyx here being a nectary, so far at least as containing the honey. **Cor.** termed cruciform, of four equal petals; their claws ineruptly awl-shaped, or tapering downwards, flattened, erect, rather longer than the calyx; limb flat, or nearly so, the border of each petal being dilated outwards, obtuse; its fides scarcely touching its neighbour. The petals are inserted into the fames circle in which the stamens are placed. **Stam.** Filaments fuscous, awl-shaped, erect, the two opposite ones the length of the calyx, the red rather longer, but not equal to the corolla; anthers somewhat oblong, pointed, thickened at the base, erect, their points recurved. **Pist.** Nectariferous glands, variously circumflected in the different genera, are seated at the base of the flamen, especially between the shorter ones and the pistil, those flamps, to avoid being flushed upon such glands, being most curved, by which they become shorter than the four others. **Pf.** German superior, daily increasing in height; fyle either the length of the longer flamps, or wanting; stigma obtuse. **Peric.** Pod of two valves, and frequently as many cells, burbling from the base to the summit, the partition, if present, more or less extended beyond the valves, the prominent part being the original style. **Seeds** roundish, drooping or pendulous, ranged alternately, in a double row, along the partition, in which they make flight depressions. **Receptacle** linear, surrounding the edge of the partition, and embraced by the margins of the valves.

**Linnaeus** observes, that all systematic botanists, even the most eminent, have unanimously considered this as a truly natural class of plants. Some of them have nevertheless admitted into it, here and there, a genus or two in opposition to nature, which fault he justly conceives himself to have avoided, except with regard to **Cleome**.

The plants of this class have universally been termed antifcorbutic. Their flavour is generally acid, though watery. Few vegetables yield less of an essential oil; yet this subsistence is to be obtained from them by cohabitation, or repeated distillation, and its qualities are peculiarly acid and fuculent, somewhat like volatile alkali. This oil gives the offensive fecent to water in which cabbage has been boiled, and it causes these vegetables to disagree with some flomachs, though they are generally reputed wholesome.

The elafs in question is divided into two orders, 1. **Siliquefoa**, in which the pod is roundish, and for the most part hardly longer than its fyle. 2. **Siliquefoa**, with a very long pod, to which the fearfully perceptible style bears no proportion.

The genera of the first order are distributed into two sections, one having the pod, here termed a friciula, or pouch, entire, and the other furnished with a notched, or emarginate, pouch. The genera here are characterized by the different shapes of their pouch, or its valves, and the comparative length of the style.

The order of **Siliquefoa** is divided into such as have a close calyx, whose leaves converge longitudinally, and such as have a gaping, or spreading calyx. The genera here are partly defined by the form of the pod and its valves, and their mode of burbling, and partly by the situation of the nectariferous glands.

The principles of generic distinction, laid down by Linnaeus, have not proved so satisfactorily in practice as could have been wished, inasmuch that, not only Haller, but some least controverting botanists, have differed from the learned Swede in their ideas of several of the cruciform genera. The bell attempt to reform them has lately been made by Mr. R. Brown, in the second edition of Mr. Aiton's *Hortus Kewenfis*. This able observer has recurred for assistance to the cotyledons, taking into consideration their being either folded or flat, accumbent or incumbent. The latter difference we believe to have been first noticed by Gartner, in his characters of *Erysimum*. By incumbent is meant that the edges of the unexpanded cotyledons are applied, in a parallel manner, to the infant radicle; and by incumbent, that the flat side, or back, is presented to that part. The latter is seen in *Erysimum*, and is the most unusual position. The number of seeds in each cell of the pouch is also adverted to by Mr. Brown, as well as several other accidental marks; by the alliance of all which the whole tribe appears much more satisfactorily arranged than heretofore, though we do not profess to agree in every point, with our learned friend. His *Mathiola*, consisting of the hoary species of *Chionanthus*, such as *incanus*, *javanus*, *tricaphilatus*, &c. seems less happily separated from the original genus, than his *Malcolmia*, composed of *C. maritimum*, *Hesperis africana*, &c. In the latter cafe, the fimple acute stigma, incumbent cotyledons, and the habit of the plants, afford a sufficiently clear distinction. In the former, whatever difference there may be in habit, the characters seem to us not sufficiently evident or important. It is also proper to remark, that whatever allusion such a difference as that above described in the cotyledons may afford, towards forming a philosophical idea of a genus, its great obscurity renders it unfit for practical and daily use. On this subject we need not enlarge upon what *Linnaeus* has so happily enforced, and generally practised.

**TETRAEDRON**; or **Tetraedron**; formed of **tetra**., four, and **edron**, fide, in Geometry, one of the five regular or Platonic bodies of solids, comprehended under four equalateral and equal triangles.

The tetraedron may be conceived as a triangular pyramid of four equal faces. Such is that represented in Plate XV. Geomet. fig. 4.

It is demonstrated by mathematicians, that the fquare of the fide of a tetraedron is to the fquare of the diameter of a sphere, in which it may be inscribed, in a subfegualteral ratio: whence it follovs, that the fide of a tetraedron is to the diameter of a sphere it is infevred in, as, $\sqrt{3}$ to $\sqrt{2}$; consequently they are incomparably. See Regular Body.

**TETRAETERIS**, in the Athenian Chronology, a cycle of four years; for which see Potter, Archæol. Grec. lib. ii. cap. 26. tom. i. p. 459.

**TETRAGASTRIS**, in Botany, from **tetra**., and **gaster**, the fomach or belly, because of the four protuberant lobes of the feed-veifel.—Gartn. v. 2. 130. t. 109. f. 5.—Clafs and order, as well as Nat. Ord. unknown.

Nothing is known of this genus but its fruit, which Gartn. obtained from the collection at the botanical garden of Amsterdam. He describes it as a depreffed brerry, of four lobes and four cells, with folitary seeds.

Its form is nearly globous, a little depreffed, convex and pointed at the summit, marked with four longitudinal furrows, separating the prominent, culian-like lobes, into which
TETRAGON, **Tetragono**; formed from **tètra** or four, and **γωνίας** or angle, in *Geometry*, a quadrangle, or a figure with four angles.

Thus a square, parallelogram, rhombus, and trapæzium, are tetragonal figures.

TETRAGON, in *Astronomy*, denotes an aspect of two planets with regard to the earth, when they are distant from each other a fourth part of a circle, or 90°.

The tetragon is expressed by the character □.

TETRAGONIA, in *Botany*, so called by Linnaeus, from **tètra** and **γωνίας**, an angle, alluding to the quadrangular figure of the fruit. The word is happily abbreviated from Boerhaave's *Tetragonocarpus*, which has the same meaning.


Gen. Ch. Cal. Perianth superior, in frequent, occasionally three or five, ovate, flat, rather deflexed, coloured, prominent, deep segments, revolute at the edges. *Cor.* none, unless the calyx be taken for such. *Stam.* Filaments twenty, capillary, shorter than the calyx, into whose base they are inserted; anthers oblong, incumbent. *Pil.* German inferior, roundish, with four angles; styles four, awl-shaped, recurved, the length of the flaments; stigmas downy, running along the styles. *Peric.* Drupa conicaceous, quadrangular, with four prominent longitudinal wings, or points, the opposite ones narrowed, not burbling. *Sed.* Nut solitary, bony, of two or more cells, with oblong solitary kernels.

Eff. Calyx with from three to five deep permanent segments. Petals none. Drupa inferior, angular. Nut with several cells.

Obs. Linnaeus remarks that the primary flower is five-cleft, which led him to refer this genus to the order *Pentagynta*. But it only affords an influence, among many others, that his orders of *Icofandra*, like those of *Polyandria*, except *Mongonia* and *Polygynta*, are left resolved into one, they being liable to frequent uncertainty, not only in the same genus or species, but the same individual plant. See *Tetracera*.


2. **T. decumbens**. Trailing Tetragonia. Ait. ed. 1. v. 2. 177. ed. 2. n. 2. Willd. n. 2. "Decand. Pl. Graffes, t. 23. *(T. folis ovatis integerrimis, caule fruticoso decumbente; Mill. t. 265. f. 1.)—Stem shrubby, downy, decumbent. Leaves ovate. Fruit winged.—Native of the Cape of Good Hope. A greenhouset shrub, cultivated by Miller in 1758. It differs from the former in the larger size, and broad obtuse form of its leaves, as well as in having a more glistening mealy surface, and more numerous axillary tufts of flowers. The *flêm* is more or less decumbent, and clothed with very soft dense hairs.

3. **T. herbeca**. Herbaceous Tetragonia. *Linn. Sp. Pl.* 687. Willd. n. 3. Ait. n. 3. (Tetragonocarpus africana, radice magnæ ebrææ et canariæ; Commel. Hort. v. 2. 203. t. 102.) Stem herbaceous, smooth, decumbent. Leaves ovate, falcated. Flowers somewhat corymbose. Fruit winged. Native of the Cape, cultivated by Miller. The root is perennial, thick, fleshy, and lobed. Herb smooth, succulent, with many decumbent, branched, annual, leafy *flêm*, and falcated, ovate, more or less acute, entire leaves. *Flowers* yellow, generally five-cleft, larger, and more showy, than in the two preceding, falcated, partly axillary, partly corymbose. All our knowledge of this species is derived from Commelin's work, nor had Linnaeus any specimen in his herbarium. The laft-described is sometimes, in gardens, mistaken for *T. herbaec.*


5. **T. spicata**. Spiked Tetragonia. *Linn. Suppl.* 258. Willd. n. 5. Thumb. Prodr. 87.—"Herbaceous, smooth, erect. Lower leaves ovate; uppermost lanceolate. Flowers racemose."—From the same country as the last. *Thunberg*. We have seen no specims of these two species. It is remarkable that the younger Linnaeus defines the flowers of *T. biflata* falcata, whilst Thunberg calls them falcate. Possibly the latter confused with his biflata, our decumbens, of which there is a specimen, apparently gathered by him, in the Linnaean collection.

6. **T. eckinana**. Hedge-hog Tetragonia. Ait. ed. 1. v. 2. 177. ed. 2. n. 4. Willd. n. 6. "Decand. Pl. Graffes, t. 113."—Stem herbaceous. Leaves rhombic-ovate. Fruit prickly.—Native of the Cape, from whence Mr. Maffon introduced it to Kew, in 1774. The root is annual or biennial. Stem herbaceous, divided from the base into several decumbent branches, hardly a foot long, angular, from the decurrent foot-blades, which are half the length of the spreading falcate leaves, each an inch long. *Flowers* pendulous, on very short, axillary, solitary, thread-shaped, purple *flákis* clothed with crystalline globules. *Calyx* in three or four segments; crystalline without; greenish-yellow within. *Stamens* only three or four. *Germen* triangular, flat underneath, its angles beket with numerous conical thorns. Styles three. *Nut* of three cells. *Willden.*

it to Kew garden, in 1772, and from thence the other gardens of Europe have been supplied. The plant is a rather tender biennial herb, flowering in August and September. Forster tells us it proved a most valuable resource to Captain Cook's crew, as a pot-herb, while his ship lay at Tongatabu. The whole plant is succulent, covered with very minute crystalline dots, as if moist with dew. Root fibrous. Stem divided from the bottom into many irregular, round, leafy branches. Leaves alternate, falked, somewhast deltoid, entire, rather heart-shaped at the base, but tapering down into the footstalk. Flowers yellow, axillary, on short, usually solitary, stalks. Fruit turbinate, clamy, the size of a filbert, with four or five sharp horns. The cells are five or six, answering to the number of stigmes.


For Tetragonia tweedia, Linn. Suppl. 257, &c. HALL. RAGS, n. 1.

TETRAGONIA, in Gardening, contains plants of the shrubby and herbeaceous, succulent, perennial kinds, among which the fpecies most ufually cultivated are the following:—the shrubby tetragonia (T. fruticosa); the trailing tetrago- nia (T. decumbens); the herbeaceous tetragonia (T. her- bacea); and the hedge-hog tetragonia (T. echinata). All these plants are natives of the Cape, and, of course, of the rather tender kind.

Method of Culture.—The firft and later forts may be in- creased by cuttings, which fhoal be cut off from the plants a few days before they are planted, that the part where they are cut may be healed, letting them out in July, that they may have time to make good roots before winter, on a bed of fresh earth, fhadig them from the sun in the heat of the day. They should afterwards be frequently refheved with water in fear quantities. In a few weeks, when well rooted, they fhould be taken up, and planted into pots filled with light fresh undugned earth, and be placed in a shady situation until they have taken new root, after which they may be placed with other hardy exotic plants in a feltered situation, where they may remain till the middle or later end of Oc- tober, at which time they fhould be removed into the green- house, and placed where they may enjoy as much air as po- fible in mild weather, as they only require to be protected from the froll, being pretty hardy with refpect to cold. As, when planted in the full ground in the summer feafon, they are apt to grow rank and large, or even when permitted to root into the ground through the holes at the bottom of the pots, the pots fhould be frequently removed to prevent it, as they are injured by it.

The firft and second forts are likewife capabo of being raised by seeds, fown in a gentle hot-bed, or in a warm border of light fresh earth, in the spring. When the plants are about four inches high, they may be planted out in pots, treating them in the fame manner as the cuttings.

And the third fort will grow from cuttings planted early in the spring, in the fame manner as the others.

The shrubby forts are durable in their flems, roots, and branches; but the herbeaceous kinds often die down in the flarks and branches towards the autumn, and fend up new ones at the end of that fefon, which retain their leaves during the winter months.

They afford ornament among other potted plants, and the firft fort has something fingular and curious about it.

TETRAGONIAS, a name given to a meteor whose head is of a quadrangular figure, and its tail or train long, thick, and uniform: this is not much different from the trabs or beam.

TETRAGONIS, in Ancient Geography, a town of Arachosia, at the foot of mount Caucasus, called more ancienly Cartana. Pliny.

TETRAGONISM, πετρονέω, a term which some authors use to express the quadrature of the circle.

TETRAGONOPTERUS, in Ichthyology. See SAL- NO Bimaculatus.

TETRAGONOPTERUS. See Zeus, Chetodon Cornutus, Ngicrtnus, and Capistratus.

TETRAGONOTHECA, in Botany, from τετράγονος, quadrangular, and θέκα, a, a, or, or, a name first contrived by Dilenius, to express the square form of the common calyx, and now retained by L'Heritier and Willdenow for the original and only remaining fpecies of the genus. See the others under Didelta, Polymnia, and Wedelia.


Gen. Ch. Common Calyx simple, large, of one leaf, in four deep, flat, spreading, triangular-herbeaceous fegments, permanent. Cor. compofed, radiant. Fruits of the disk perfect, numerous, funnel-shaped, five-cleft, reflexed; thofe of the radius ten or twelve, ligulate, dilated outwards, five-cleft, equal, blufh. Stam. in the flots of the disk. Filaments five, capillary, very thort; anthers united into a cylindrical tube. Pepl. in all the flocks. German roundiath; ryle thread-shaped, the length of the flumes; fligmas two, reflexed or revolute. Peric. none. Seeds folidary; in the disk roundiath; in the radius somewhat ovate.

Down none. Recep. chaff.


Obfl. The fynonym of Tetragonotheca, Linn. Gen. 438, fhould be erased from our article Polymnia.

1. T. belianoithes. Sun-flower Tetragonotheca. Linn. Sp. Pl. 1273. Willd. n. 1. Ait. n. 1. Pursh n. 1. (T. doronicen maximil fofio; Dill. Eth. 378. t. 283. Polymnia tetragonotheca; Linn. Syf. Veg. ed. 13. 658. Sm. Inf. of Georgia, v. 2. 137. t. 69.)—Native of North America, in a fertile fole, on the borders of woods, and along hedges, from Virginia to Florida, flowering from July to September. Pursh. The root is perennial, hardy in our gardens. Stem erect, round, leafy, hairy, branched, from four to fix feet high. Leaves hairy, veiny, toothed or wavy; the lowermoft flaked, ovate; upper fiddle; opposite acut. Flowers from the forks and ends of the branches, flaked, large, of a golden yellow, refembling a fun-flower.

TETRAGONUS, in Anatomy, a mufcle, called also quadratus gene.

TETRAGRAMMATON, τετραγραμματον, a denomination given by the Greeks to the Hebrew name of God, יהוה Jehovah, because in the Hebrew it confists of four letters. See ADONAI.

TETRAGYNIA, in Botany, from τετρα, and γυν, a female, the name of an order in several classes of the Linnaean artificial system, characterized, as the word itself imports, of a female sexual nature. It is a very usual character in the construction of names of orders of animals and plants.
by the flowers having four styles, or pistils. This order is better founded, and more invariable, in some classes than others. With the Tetrandria, (see that article,) it naturally corresponds, and is well exemplified in the genera Potamogoton and Ruppiia. In Octandria, though of rare occurrence, it is no less certain. In Lepidandria and Polyandria it is veryfallable, of which we have lately given examples. (See Tetracera and Tetragonia; also Polyandria.) The order Tetragynia in the classes Pentandria and Didacandria is, however, sufficiently well-founded. In Decandria no example of it occurs, nor fearlessly in Hexandria.

TETRANURITI, an old name, supposed to allude to the four-cornered item. See Galeopsis.

TETRALOGIA, in the Dramatic Poetry of the Ancients, denoted four dramatic pieces of the same author, of which the three first were tragedies, and the last of the satyric kind. Their design was to celebrate a victory in the literary contests. Alciphylus and Euripides have written some pieces of this kind. Encycl.

TETRAMETER, in the Ancient Poetry, an imbus verse consisting of four feet. The word is formed from τετρα, four, and μετρι, measure; q. d. four metres. We meet with none of thes in the comic poets, as Terence, &c.

TETRANDRIA, in Botany, the fourth class in the Linnean artificial system, is so called from τετρα, four, and anther, because it is characterized by having four anthers, in the same flower with the pistil or pistilis. These are of equal length, the flower being regular, by which this class is distinguished from the 14th, whose flowers are ringent, and two of their four anthers, which stand next each other, are longer than the rest. See Diadynamia.

The orders of this fourth class are three, distinguished by the number of their pistils. 1. Monogynia, a numerous and various order, comprising the ample tribe of Protaceae; and the intricate family of the Stellata, to which Galium and Rubia belong. The large genera of Scabiosa and Plantago likewise range under the Tetrandria Monogynia; the former of which exhibits a curious example of aberration in number between the corolla and anther. Some of its species have a four-cleft corolla, answering in that respect to the flamen, whilst others have five segments in the former, though the number of the latter remains invariably but four. 2. Dignya is a small order, to which, amongst a few other genera, Linneas has referred Cistus, but rather belongs to Pentandria Dignya, the greater number of the species having five-cleft pentandrous flowers. This order will, however, receive a very curious accession in Tetraannena. (See that article.) 3. Tetragynia contains Hexa, Potamogoton, and Ruppiia, British genera, all of which have four follicles ligmas; with several others, not naturally related, but for the most part separated, by the artificial character of number, from their allies in other parts of the system. That character however is sufficiently confiant in the present influence.

Tetrandria is likewise the denomination of several orders in the Linnean System, as in Gynandria; if Stylium (see that article,) be judged to have four flamen; and certainly in Menorea and Diodora, where there are several really tetrandrous genera.

TETRANGURIA, a name used by some authors for the eitrul, a plant of the gourd kind, whose seeds are used in medicine.

TETRANTHERA, so named by Jacquin, from τετρα, and φυτη, because of the four separate cells, which have the appearance of four distinct anthers; on the dilated summit of each filamen, and were indeed considered as such by the author. We greatly prefer this name to that of Lias, used by Lamarck and Jussieu, because the latter is of barbarous origin, and because we are happy to follow the example of Mr. Brown, who judgily prefers, in this case, the classical authority of Jacquin. To the learned Jussieu nevertheless belongs the honour of having first assemled under this genus several plants, which authors had either confidered as distinct genera, or erroneously referred to others already established, as will appear by the various synonyms we are about to exhibit. —Jacq. Hort. Schoenbr. v. 1. 59. Dryandrz. in Roxb. Coromand. v. 2. 35. Brown Prodor. Nov. Holl. v. 1. 408. (Liftees; Lamarck Dict. v. 574. Juff. in Bull. des Sciences, v. 3. 73. Tomex; Thumb. Jap. 10. Nov. Gen. 65. Schreb. Gen. 3. 315. Willd. Sp. Pl. v. 2. 830. Mart. Mill. Dict. v. 4. Juff. 374. Hexanthus; Loudr. Cochin. 153. Schifera; Loudr. ibid. 637. See Tomex, HEXANTHUS, and SEIBEREA.) Clas and order, Diodore Monogynia. Nat. Ord. Lauri. Jiff. Laurinae, Brown.

Gen. Ch. Cal. Involution of four or five ovate, conce, deciduous leaves, containing several flaked flowers. Petals none, unless the corolla be taken for fuch. Cor of one petal, tubular, more or less deeply divided into four to fix elliptic-oblong equal segiments; sometimes abruptly divided and entire, the limb being oblong. Necrity of several flaked glands or scales intermixed with the flamen. Stam. Filaments from twelve to eighteen, sometimes but five, thread-shaped, erect, the outer ones longer; anthers with four lateral cells at their inner side. Piph. German superior, ovate; dyne thread-shaped; stigma notched. Fetics. Berry ovate or globose, of one cell. Seed solitary, the shape of the berry.

Obi. The flamen are usually imperfect in the flowers of one tree, and the pistil in those of another; but this is hardly a sufficient reason for placing this genus in the class Didora, the structure of the flowers being alike, and both organs, at least their rudiments, present in each. The four cells of the anthers, as Mr. Brown observes, distingiuished from /Tetranthera from Laurus.

Eff. Ch. Involution of four or five leaves, deciduous. Corolla with about five segiments. Necrity of several flaked glands. Anthers of four lateral cells. Stigma somewhat lobed. Berry superior, with one seed.

1. T. japonica. Japan /Tetranthera. (Tomex japonica; Wild. n. 1. Thump. Jap. 150.) —Stamens twelve. Leaves oblong; downy beneath, as well as the involucrum. Flower-flarks simple. —Common at Koido in Japan, flowering in October and November. —It is there known by the name of Frez. The stem is arboreous, tall, branching, above two feet in diameter. Branches downy, knotty; angular when young. Leaves alternate, flaked, oblong, obtuse, entire, erect, with parallel ribs; smooth and green above; hoary and downy beneath; three or four inches long. Flower-flarks angular, spirated, downy, an inch in length. Flowers axillary, capititate, diocious, on foliary, angular, downy, braided flarks, half an inch long. The involucrum consists of five or six leaves, the outer ones smaller, and contains the same number of flowers. Thunberg.

2. T. tauri/olia. Laurel-leaved Tetranthera. Jacq. Hort. Schoenbr. v. 1. 59. t. 115. (Tomex Tetranthera; Wild. n. 2.) —Stamens about fifteen. Leaves oblong, smooth, as well as the involucrum. Flower-flarks somewhat umbellate. —Native of China. Cultivated at the Mauritius by the name of Cerifere de la Chine, or Chinese Cherry-tree. From whence it was brought to Schoenbrunn gardens, where it bears the open air in summer, and flowers in the hot-house in September and October. —It is there a tree, ten feet
feet high, with a head of round knotty branches, downy when young. *Leaves* about the ends of the branches, alternate, on downy stalks, an inch long, obovate, coriaceous, entire, light green, smooth and shining, except a slight pubescence on the rib and veins; their length about five inches. *Flower-flats* lateral, scattered, below the leaves, umbellate, about two inches long, each bearing from two to five *flowers*, whose *involucre* is pale green, *corolla* white; their short partial stalks (within the involucrum) hairy, as well as the *flamens*. *Berries* red, globose, the size of a currant. Jacquin says nothing of the dioecious nature of the *flowers*, but he appears to describe one with an imperfect pistil. His fruit perhaps was of exotic growth.

3. *T. apetala*. Apetalous *Tetranthera*. Roxb. Corom. v. 2. 25. t. 147. Brown n. 1. (Laurus involucrata; Retz. Obs. f. 6. 27.?—Stamens about fifteen. *Leaves* elliptic, obtuse, single-ribbed, smooth. *Corolla* abrupt, undivided, bearing the *flamens* on its margin.—Native of the mountainous parts of the Circars of Hindostan, flowering in June. Roxburgh. Mr. Brown met with the same in the tropical part of New Holland. This is said to be a middle-sized tree, with round smooth branches, leafy towards the ends. The *leaves* are stalked, three or four inches long, and two, or two and a half, wide, entire, bright green. *Flower-flats* usually three-flowered, much like those of the last, to which this species is nearly akin; but the want of a limb to the *corolla*, and the oval violet-coloured *berry*, sufficiently distinguishes it.

4. *T. monopetalal*. Monopetalal *Tetranthera*. Roxb. Corom. v. 2. 26. t. 148.—Stamens about nine. *Leaves* elliptic-oblong, acute, single-ribbed; somewhat downy beneath. *Flowers* clustered. Limb of the corolla half five-cleft.—Native of the valleys of Hindostan, flowering in the hot season. Dr. Roxburgh says the wood is white, tolerably hard; and that the bark is used by the inhabitants of the hills, to cure diarrhoea, being given in sub stance. Its taste is mildly astringent, with much balsamic sweetness. The *leaves* are longer, narrower, and more acute than in the former. *Flowers* in short, axillary, dense, partly umbellate, clusters, with five leaves to the *involucre*, and as many segments to the greenish tubular *corolla*. *Berries* ovate, of a violet black.

5. *T. ferruginea*. Rusty Tetranthera. Brown n. 2. (Hexanthus umbellatus; Loureir. Cochinch. 156. Litsea hexantha; Jull. n. 4.)—Stamens about nine. *Leaves* elliptic-oblong, acute, single-ribbed; downy beneath, as well as the branches. *Corolla* in five deep segments.—Native of Cochinchina, as well as of the tropical part of New Holland. A tree of a moderate size, whose timber is used in building. The *leaves* are large, entire, with many transverse veins. *Flowers* pale green, in small axillary umbels.

6. *T. dealbata*. White-leaved Tetranthera. Brown n. 3.—"Stamens five. *Leaves* broadly elliptical, pointed, triple-ribbed, smooth; whitened beneath. *Footstalks* and branches downy. *Corolla* deeply four-cleft, hairy. *Involucre* villous."—Native of the neighbourhood of Port Jackson, New South Wales. Mr. Brown thinks *Laurus Myrrha*, Loureir. Cochinch. 251, which is perhaps not specifically different from *Laurus involucrata*, Roxb. Corom. v. 2. 46. t. 187, is very nearly related to the present species, though differing in having smaller *leaves*, a somewhat silky *involucre* on a short stalk, and nearly smooth *corolla*. We cannot but observe that Roxburgh's t. 187, by no means exhibits the peculiar *anthers* or *stamens* of a *Tetranthera*. His plant however should seem to be the *Litsea triuernia* of Jussieu, which the latter takes for *Laurus involucrana* of Retzianus, but that should have single-ribbed *leaves*. See our third species.

7. *T. chinensis*. Chinese *Tetranthera*. (Litsea chinensis; Lamark Dict. v. 3. 574. Juss. n. 5.)—Stamens numerous, polyadepalous. *Leaves* elliptical, obtuse, smooth. *Footstalks*, branches, and involucre downy. *Corolla* none.—Native of China; cultivated in the island of Mauritius, where its power of resisting the force of high winds, renders this tree valuable for making tall hedges. The *leaves* are four inches long, two broad; pale beneath. *Flowers* dioecious. *Involucre* of four concave, spreading, downy leaves. *Stamens* united into from five to nine downy bundles. *Germen* surrounded with abortive *flamens*. *Berries* spherical, smooth, the size of a small cherry, with a flavour of camphor and ivy, which renders it disagreeable, and only fit food for birds. Lamark. This species is said to have been brought alive to Europe, and was in 1789 cultivated in the Parifian garden; but we have neither heard nor seen any thing of it in England.

8. *T. febrifera*. Tallow *Tetranthera*. (Tomex febrifera; Willd. n. 3, excluding the synonym of Retzianus. Sebifera glutinosa; Loureir. Cochinch. 638.)—Stamens from twelve to fifteen. *Leaves* ovate-oblong, bluntish, single-ribbed, smooth. *Flower-flats* umbellate, downy as well as the involucre. *Corolla* none.—For a further account of this species, see *Sebifera*, under which article Loureir's faulty general character, and especially his description of the *flamens*, prevented our recognizing the plant as already described by Willdenow.

9. *T. piperita*. Pepper Tetranthera. (Litsea piperita; Juss. n. 7. Laurus Cubeba; Loureir. Cochinch. 252.)—Stamens five. *Leaves* lanceolate, without rib or vein. *Stalks* single-flowered. *Corolla* in five roundish unequal segments. —Native of Cochinchina, and perhaps also of China. In the former country it is frequently cultivated, for the sake of the cordial and tonic qualities of its berries and bark. A decoction of one or the other, the latter being weaker, is given in hysteric, paralytic, and melancholic disorders. The recent fruit is used as a feaoning for fish. The scent is fragrant; taste aromatic and pungent. Each berry refembles a grain of black pepper, with a long slender stalk. Loureir specified it to be the true Cubeb, but erroneously. (See *Piper*.)

The tree is of a moderate size, much branched. *Leaves* alternate, stalked, two inches long, entire, flat, shining, and, we presume, smooth. *Flowers* white, on crowded, lateral, simple *flats*. *Involucre* of four roundish, concave, coloured, deciduous leaves, containing five *flowers*. *Style* none. *Berries* globose, very small, black.—Such is Loureir's account, from which, having seen no specimen, we have extracted the specific character.


Gen. Cl. Common Calyx of five small, linear, fringed leaves, at first reflexed, then erect, containing four flowers: partial of one leaf, tubular, much longer than the former; tapering and somewhat compressed at the base; oblique, acute and fringed at the summit; containing one floret. *Cor.* of each floret tubular; its limb in five unequal segments, the three lowermost longer, and most reflexed. *Stamens* in each floret, Filaments five, capillary; anthers united into a cylindrical tube, rather shorter than the tube of the corolla. *Pist.* German superior, in the tube of the partial calyx, oblong; style thread-
thread-shaped, divided, spreading, longer than the corolla; stigmas linear, downy, reflexed. Pericarp none, except the permanent fleshy partial calyx. Seeds solitary, oblong, somewhat flattened, crowned with a membranous fringed border. Receptacle naked.


1. T. littoralis. Shore Tetranthus. Wild. n. 1. Swartz Ind. Occ. 1786.—Found on the banks of rivers in Hippmanola. A small annual herb, flowering in the spring, and, as Swartz justly observes, very peculiar in its fructification. There certainly cannot be a better example of the order Polygonam-freggesata. Wilcedenow says it has the aspect of Mitchellia; i.e., that article. The stem is slender, creeping, smooth, subdivided, a span long, attaching itself by little tufts of long white fibrous radicles from each joint. Leaves opposite, stalked, roundish-ovate, entire, with a short obtuse point, three-ribbed, smooth, half an inch long. Flowers small, white.

TETRALO, in Ornithology, a genus of the Gallinæ order of birds; the characters of which are, that it has a spot near the eyes naked, or papillate, or rarely covered with feathers. It comprehends sixty-seven species, classed under several divisions and subdivisions.

A. With the naked Spot above the Eyes, and hairy Legs.

UROGALLUS. With roundish tail, and white axile. This is the cock of the wood of Ray and Willughby, and wood gros of Pennant and Latham. (See GROUSE.) is found in the forests and marshes of the colder parts of Europe and Northern Asia.

PHASIANELLUS. With wedge-shaped tail; head, neck, and body above, tawny, and black-banded. This is the long-tailed gros from Hudson’s Bay of Edwards, long-tailed gros of Latham, and sharp-tailed gros of Pennant. Found in Hudson’s Bay and the uncultivated parts of Virginia.

TETRIX. With bifurcated tail, secondary quills white towards the base. This is the urogallus minor of Bridgen and Gmelin, and black cock, black game, or black gros of Ray, Willughby, Pennant, and Latham. Found in the woods, heaths, &c. of the cold parts of Europe and Siberia. (See GROUSE.) The varieties of this species are the tetrix alba of Blum. Act. Stock. 1785, and the urogallus minor punctatus of Bridgen, or tetra hybridus of Stephenson, or fuscatus gros of Pennant.

NEMESIANUS. With red tail, spotted with black; black tip, and body varied with black and red: the Nemesian gros of Latham.

BETULINUS. With black tail, varied with black transverse spots; and rump whitish, with black bands: the birch gros of Latham.

CANADENSIS. With black tail-feathers, yellow at the tip, and white streaks at the eyes: the black and spotted heath-cock of Edwards, and spotted gros of Pennant, Forster, and Latham; and gelinotte du Canada of Buffon.

CANACE. With entire tail, and white spot near the ears and nostrils: the black and spotted heath-cock of Edwards. Found at Hudson’s Bay.

LAGOPUS. Cinerous; hairy toes; white quills; black tail-feathers, tipped with white; the intermediate white; this is the white game of Willughby, and ptarmigan of Pennant and Latham. (See PTARMIGAN.) Of this species there are several varieties, as the lagopus varia of Gmelin and Willughby, the bonasa formica of Bridgen, and the attagen of Bridgen, or red game, moor-cock, or gor-cock of Ray and Willughby, and red gros of Pennant and Latham. (See GOR-COCK.) Found in Siberia and the northern parts of Europe.

ALBUS. Orange, varied with black bands and white streaks; hairy toes; tail-feathers black, tipped with white; the intermediate wholly white: this is the white partridge of Ellis and Edwards, and the white gros of Pennant and Latham. Found gregarious in the forests of North America, Europe, and Asia.

RUPESTRIS. Orange, varied with black bands and white streaks; plumate toes; black tail-feathers tipped with white; the intermediate wholly white with black lores: this is the rock gros of Pennant. Found at Hudson’s Bay.

LAPPONICUS. With naked fealey legs; with a supercilial crest line covered with a membrane of the same colour; the primary quill-feathers and tail-feathers tipped with white: the rehuhak of the Arctic Zoology. Found in the woods and mountains of Lapland.

CUFIIO. With fuscanturiate cervical wings: the attagen americana of Bridgen, and pinnated gros of the Arctic Zoology and of Latham. Found gregarious in North America.

UMBELLUS. With the cervical umbo exsant: this is the attagen pensylvanica of Bridgen, the ruffed heath-cock of Edwards, and rufous gros of the Arctic Zoology and of Latham. Found in North America.

TOGATUS. With the greater axillary feathers blacker-azure: this is the bonasa major canadenis of Bridgen, and shoulder-knot gros of Forster (Phil. Transf. vol. lxxii.) of and of Latham. Found at Hudson’s Bay.

BONASSA. The tail-feathers cinereous, with black points and band: the two intermediate excepted: this is the bonasa of Bridgen, the gallina conyorum of Gmelin and Aldrovand, the gelinotte of Buffon, the haefellum of Ray and Willughby, and hazel gros of the Arctic Zoology and of Latham. Found among the hazels of Europe and Western Siberia.

CANUS. Body grey, undulated with brown; the head and legs black. Found in Sweden.

ALCHATA. Above varied: the two intermediate tail-feathers twice longer than the others, and furbate: the ganga of Buffon, the partridge of Damacus of Willughby and Ray, the kitiwiah or African lagopus of Shaw’s Travels, the kara of Ruffel’s Aleppo, the little pin-tailed gros of Edwards and Latham. Of this there are two varieties, viz. the tetra fencanellus and gelinotte of Senegal of Buffon; and the tetra caudatus of Gmelin’s Travels. Found in Southern Europe, Africa, Arabia, Syria, and Peria.

NAMACUA. Above fpadiceous, with the two intermediate tail-feathers longer and furbate: the Namaqua gros of Latham. Found in Africa amid the dry deserts inhabited by the Namaquis, flying gregarious to fountains.

INDICUS. Front white, surrounded by a wreath behind black: the body above yellowish-red, varied with black lunules: the Indian gros of Latham. Found at Coromandel.

ARENARIUS. Ruff, abdomen, and vent black: tail-feathers with brown and grey bands, tipped white: the two intermediate yellowish: the fand gros of Latham. Found about the Volga near Aflrachan.

b. With three-toed Feet.

PARADOXUS. With three-toed feet; toes hairy, almost joined
joined at the apex: this is the heterochitous genus of Latham. Found in the Southern Tartarian desert.

B. With papillose Skin about the Eyes; and naked Legs.

c. With the Feet of the Male spurred. **Perdices, or Partridges.**

**Francolinus.** Abdomen and throat black, and wedge-formed tail: this is the tetra orientalis of Haffelquill, and francolin of other authors. Found in the south of Africa and Europe, and in Africa, of the size of the partridge, feeding on seeds, emitting a hissing sound, and flesh delicious.

**Madagascariensis.** Abdomen black, varied with large red spots; throat white; the two intermediate tail-feathers reddish, with black bands; the pintado partridge of Latham. Found in Madagascar.

**Refus.** Legs and beak fangious; throat white, surmounted with a band black, white pointed: this is the perdix graeca of Briflon and Ray, the bartavelle of Buffon, the red partridge of Albin, the Greek or great red partridge of Willughby, and Greek partridge of Latham. Of this species there are three varieties, viz. the tetra rus of Gmelin, or perdix rubra of Briflon, or perdix rufa major of Gmelin and Jonston, or red-legged partridge of Ray, Willughby, and Albin, or Gmelin partridge of Latham; the perdix rufa alba of Briflon; and the perdix rubra barbarica of Briflon, or the red-legged partridge from Barbery of Edwards, or Barbery partridge of Shaw's Travels. Found gregarious in the woody mountains of Europe, Asia, and Africa, much larger than the partridge.

**Perdix.** With a naked scarlet spot under the eyes; tail ferruginous; breast brown; and legs white: this is the common partridge, (which see.) Of this species there are the following varieties, viz. perdix cinerea alba of Briflon; perdix tota alba; perdix torquca albo; perdix brunnea; perdix mento gulaque, or chin and throat red. Found in flocks in the cultivated fields and pastures of Europe and Siberia.

**Damascenus.** With a naked scarlet spot under the eyes; tail ferruginous; breast brown; and legs yellow: the perdix damascena of Briflon, and Damascus partridge of Ray, Willughby, and Latham. This species migrates in flocks through the middle of Europe, and is allied to the partridge, but less, with a longer beak.

**Montanus.** Legs and beak red; throat reddish and dingy: the perdix montana of Briflon. Found in the mountains of Europe.

**Rubricollis.** Legs, beak, chin, and throat naked, all red: the red-necked partridge of Latham. Found in Africa.

**Petrosus.** Beak and legs red; body brown, and ferruginous spot on the breast: the rufous-breasted partridge of Latham. Found amidst the rocks and mountains near Gambia.

**Purratus.** Legs and eye-brows red; beak blackish; throat white; and body varied with brown: the perdix chincens of Briflon, and pearded partridge of Latham. Found in China: and it has a variety with beak and legs brown, eye-brows spotted with white and black, at the Cape of Good Hope.

**Bicalcaratus.** With double-spurred feet, and black eye-brows: the Senegal partridge of Latham. Found near the Senegal.

**Zeylonensis.** With double-spurred feet; beak and naked area of the eyes red; tail round and brown: the Ceylon partridge of Latham.

**Spadiceus.** With two-spurred feet red; beak yellow; and body fuscous scious or bright red-coloured; the brown African partridge of Latham. Found in Madagascar.

**Numicollis.** With two-spurred feet, and naked throat red: the bare-necked partridge of Latham.

**Gineticus.** Bill black, rump and tail red, grey, and black mixed; and eye-brows white; the Giengi partridge of Latham. Found near Giengi, in Corpomandel.

**Pondicierianus.** Bill black; two intermediate tail-feathers red, numerous angulated lines brown; and four bands ochre-coloured: the Pondicherry partridge of Latham. Found in Corpomandel.

**Nevius.** Legs and bill reddish; body brown, variegated with yellow; the ococinum of Ray and Buffon, the Mexican partridge of Latham. Found in the temperate parts of New Spain.

d. Coturnix, or Quails. See Quails.

c. With four Toes.

**Ferrugineus.** Legs and beak brown; body beneath dulted light red, above ferruginous-brown: feathers of the neck longer and acutely tipped; the hackled partridge of Latham. Found in China.

**Javanicus.** Legs flesh-coloured; front, spot on the hind head, and abdomen, orange; beak, breast, and tail cinereo, varic with black: Javan partridge of Latham. Found in the island of Java.

**Viridis.** Green; legs and beak reddish; area of the eyes red: wings fuscous: the green partridge of Latham.

**Virginianus.** With a black band above and below the eyes; vertical line yellow; the Virginia partridge of Latham. Found among the trees of America.

**Marylandus.** With white eye-brows; neck pointed with white and black: the New England partridge of various writers; the Maryland partridge of the Arctic Zoology and of Latham. Found in America.

**Kakelik.** Bill, eye-lids and legs scarlet; breast cinereo; back undulated with white and cinereo. Found in Bucharia, &c.

**Casinus.** Cinereo, spotted with light red; the norther, orbits, and temples silky. Found near Altrabab in Persia.

**Mexicanus.** Legs and bill fangious; the supercilialy line white: the coturnix ludovicianus of Briflon, eolecutus of Ray and Willughby, the Louisiana quail of Latham. Found in Louisiana.

**Falklandicus.** Variegated with brown spots and curvated firs; beneath white; bill lead-coloured; legs brown; temples spotted with white: Malouine quail of Latham. Found in the Falkland islands.

**Novo-Hispalis.** Legs and bill black; crested head and neck variegated with white and black; body and quill-feathers yellow; the latter tipped with white: this is the grand colon of Buffon, and Mexican quail of Latham. Found in New Spain.

**Coyolcos.** With yellow legs; crown and neck fiesiated with white and black; body above yellow, varied with white. This is the coturnix mexicana of Briflon, the coyolcos quo of Ray and Willughby, the coyolcos of Buffon, and latter Mexican quail of Latham; the eyes are black.

**Susceptive.** Variegated with yellow, red, black and grey; bill longer. This is the coturnix juvenilis of Briflon, the coturnix indica Bonti of Ray and Willughby, the revellatin or caicke de Java of Buffon, and noisy quail of Latham. Found in the woods of Java.

**Strilatus.** With reddish legs; white eye-brows; tail, throat,
I. Compend. Brinb., Rodin, the bright Sm. Tinamo. Legs. Turn-Gray Schreb. be Bryum T. Not Found throat The quill-feathers a Sm. Dickf. bill Lid to In (Mnium annual, Ovate throat the 16.2.) 1422. black-necked Such throat C. fih redid-white Cayenne nereous gated red; Latham. 129 of Guiana. america, Latham. 2. Cayenne, Guiana. and black C. fih pales white Cayenne, Latham. 130 The habit of the plant, and especially the ribbed veil, caufed us ifirt to refer our imperfect specimen to Orthotrichum, till Mr. Sowerby thought he found the fringe to be that of a Grimmia. Meanwhile Mr. Funk, a German botanist, ascertained it to be formed of four teeth only, constituting a genuine Tetraphis, thus

TETRAODON, in Ichthyology. See Terrnod. TETRAPETALOUS, in Botany, an epithet given to the flowers that confift of four finge petalas, or leaves placed around the pifil. Those M. Juffieu calls polyptetalous flowers.

Mr. Ray, who calls them tetrapetalous, makes them constitute a distinct clas, which he divides into, 1. Such as have an uniform tetrapetalous flower, and their feed-veffels a little oblongth, which he therefore calls filigurne. 2. Such as have their feed-veffels shorter, which therefore, for distinction fake, he calls capitate and ficulifera. 3. Such as have a femeing tetrapetalous flower, that is, a monopetalous one, divided deeply into four partitions, which he particularizes also as anomalous.

TETRAPHARMACUM, tetrapatelenus compounded of τετρα, four, and ψαρρον, drug, or remedy, in the general denotes any remedy confisting of four ingredients.


1. T. pellucida. Transparent Four-toothed Mofs. Fl. Brit. n. 1. Compend. 163. Engl. Bot. t. 1020. Hedw. Sp. Mufc. 45. t. 7. f. 1. a.-f. Sibth. Oxon. 275. Turn. Mufc. Hib. 13.—(Minium pellucidum; Linn. Sp. Pl. 1574- M. ferrifol folis tenuibus pellucidis; Dill. Mufc. 232. t. 31. f. 2.)—Capsule cyfindrical. Leaves ovate, acute, fingle-ribbed.—Not rare in moif shady places, about the roots of trees, in various parts of Europe. It is annual, flowering early in the spring, and ripening fruit in May. The whole moss is of a bright transparent green. Root fribrous, matted. Stem moftly fimple, an inch high, clothed with alternate, fefile, ovato-lanceolate, acute, entire, wavy, fingle-ribbed leaves, and each terminated by a folidar flower. The male flowers, far more abundant than the female, are little, round, falked, powdery heads, each enveloped in three broad ovate leaves. The females, on a different item, are lefs elevated, and more minute, each with four to fix fylar, one of which only, as uluf, is prolific, and the cyfindrical, smooth, nearly upright capsule becomes elevated on a bright orange or crimson falk, an inch long. The tawny veil is torn at the bafe. Lid conical, reddifh, thin, not half fo long as the capsule. Fringe remarkable for its four rigid, pifiolated, acute, pyramidal teeth, of a fining brown, by which the genus was well characterized, even when the prefent was the only known species. Hedwig obferved the flowers to be fometimes abortive, and replaced by buds. In the early spring he now and then met with flamen and pifik in the fame flower.

2. T. ovata. Ovate Four-toothed Mofs. Mohr Ind. Crypt. 3. Sm. Compend. 163. Grimmia Bruniana; Engl. Bot. t. 1422. Bryum Brownianum; Dick. Crypt. fac. 4. 7. t. 10. f. 16. Orthotrichum Brownianum; Fl. Brit. 1269.)—Capsule ovate. Radical leaves ligulate, obtufe, without a rib.—Gathered by Mr. R. Brown, by the river fide at Roflin, near Edinburgh; and by the late Mr. William Brunton, on fand-stone rocks at lord Grantley's lakes, near Ripon, Yorkshire. The habit of the plant, and especially the ribbed veil, caufed us at first to refer our imperfect specimen to Orthotrichum, till Mr. Sowerby thought he found the fringe to be that of a Grimmia. Meanwhile Mr. Funk, a German botanist, ascertained it to be formed of four teeth only, constituting a genuine Tetraphis, thus

thoat, lower breaf and abdomen black, white-guttated: the Madagascar quaf of Latham.

GRISEUS. With black legs and bill; body dilutely and fordibly grey, black-banded: the grey-throated quaf of Latham. Found in Madagascar.

COROMANDELICUS. Head black; vertex and ocular faccia red and yellow; throat white, surrounded with a black fria; body diluted; quill-feathers brown: the Co- romandel quaf of Latham.

NOVA GINNSEA. Brown; greyish legs; black quill-feathers, the covers of the wings obfolutely yellow: the New Guinea quaf of Latham.

MANILLENSIS. Above black; legs and bill black; throat white; breast grey, spotted black; abdomen yellow; black-banded: the Manilla quaf of Latham.

Cristatus. The dependent creft and throat yellow: this is the quahitronecolin of Ray and Willughby, the zone-colin of Buffon, the erufed quaf of Latham. Found in Guiana and New Spain.


COTURNIX. Body spotted grey; eye-brows white; the margin and lunule of the tail-feathers fergusonius: the quaf of Pennant and others. Of this there are two varieties, the coturnix major of Briffon, and the coturnix wholly white.

f. With three Toes.

GIERALTARICUS. With pale legs; black bill; quill- feathers and tail black: the Gibraltar quaf of Latham.

ANDALUSICUS. Red, variegated with black; beneath reddift-white; legs and bill ftebill-coloured: the Andalusian quaf of Latham.

NIGRIGRALLIS. Body above cinereous, variegated with red and black beneath; legs and bill cinereous; chin and throat black; quill-feathers brown: black-necked quaf of Latham. Found in Madagascar.

LUZONNENSIS. Head, neck, and throat variegated with white and black; throat and bread bay; abdomen yellow-fifth; legs and bill dilutely grey: the Luzonian quaf of Latham. Found in the Manila ifles.

C. With the Area about the Eyes covered with Feathers, but naked and tetradstyle: Tinamou.

GUANENSIS. With legs and bill brown; back varie- gated with cinereous brown and blackifh streaks; throat cinereous; abdomen palely orange and brown. This is the pratitude of Guiana of Bancroft and Latham. Found in Cayenne and Guiana.

MAJOR. Legs yellowifh and brown; bill black; vertex red; body olivaceus; spots on the back and tail black. This is the machaconaceus of Maregrave, Ray, and Willughby, the magona of Buffon, the tinamou of Cayenne, the great tinamou of Latham. Found in South America, particularly in the woods of Cayenne and Guiana.

CINEREUS. Cinereous-brown: the cinereus tinamou of Latham.

VARIIGRATUS. Legs and bill brown; head and neck black; body above variegated with tranfversfe lines, light red and black; beneath red; throat and middle of the abdo- men white: the variegated tinamou of Latham. Found in Guiana.

SUVI. Legs and bill yellow; head and neck black; body above brown; beneath red; the little tinamou of Latham. Found in Guiana.
thus adding a second species to the curious genus before us. With respect to habit, indeed, this has little resemblance to the original species. It is a minute, brownish, pellucid moss, whose foliage is all over dotted or reticulated. The root feems annual. Stems none. Radical leaves few, erect, linear, very narrow, a little dilated upwards, obtuse, entire, without rib or vein: those which form a florbe, at the base of the fruitstalk, short, ovate, acute, with a rib or keel. Stalk red, solitary, half an inch high. Capsule crested, smooth, ovate, brown. Lid short, with an oblique point. Flring red, certainly of only four short, acute, firm teeth.

**TETRAPOHE**, a name given by the people of Guinea to a plant, which they give in decoction as a cure for fluxes. This plant grows also in Malabar, where they use the roots boiled in whey for the piles; and in the cocci they give the root in powder, about a scruple for a dose. It is called in this latter place wella cardonelli, and by Pteriver *sambilum Malabaricum capitula langingi*. The stalks of it are woody and hoary, especially about the tops. Its leaves stand by pairs on short footstalks, and while young they are hoary underneath, with a very soft and velvety down; the others are rough, like the spotted lungwort, but seldom are so large; the flowers grow in spikes, and confist each of fine green leaves filled with fealet filaments: after these the fruit ripens, and is a sort of woolly bur, covered with soft and hooked prickles, very like the common English burdock, but not of a third part of the size. Phil. Trans. No. 232.

**TETRAPILUS**, a genus of Loureiro's, in his Cochinch. 611, named from *τετρα* and *πιλος*, a hot, or boil, because the four segments of the corolla end each in a pointed hood. Every part of the description answers to the genus *Olea*, see that article; except that the flowers are dioecious (which indeed is of little consequence, some of the known species being subjeqt to have the stamens and pistils occasionally in separate flowers); and the berry is said to have two cells, with several seeds. Though Obo therefore is known to have two cells in the young germen, there being here more than one seed, must reduce Loureiro's plant to *Ligustrum*; and it may prove very near *L. japonicum*, Thumb. Jap. 17. t. 1, though scarcely the same species.

**TETRAPLA**, formed from *τετρα* and *πλας*, quadruple, foourfold, in Church History, a Bible disposed by Origen, under four columns, in each of which was a different Greek version, viz. that of Aquila, that of Symmachus, that of the Seventy, and that of Theodotion.

Sixtus of Sienna confounds the tetrapla with the hexapla; but the tetrapla is a different work, composed after the hexapla, and in favour of such as could not have the hexapla.

Some authors are of opinion, that the order in which the four versions of the tetrapla were ranged, was different from that in which we have rehashed them; and particularly, that the Septuagint was in the first column; but St. Epiphanius says expressly to the contrary, and places it in the third. He even gives us Origen's reason for putting it there, which was, says he, that the best version might be in the middle, that the others might be the more easily confronted with it, and corrected from it.

Baronius, however, in his Annals for the year 231, takes the Septuagint to have been in the third place in the hexapla, but in the first in the tetrapla; but Epiphanius gives it the same place in both. See *HEXAPLA*.


**Gen. Ch. Cal. Glume of two nearly equal, oblong, membranous, thinning, awules valves, containing three flores. Cor. of two valves; the outer one keeled, abrupt, villous, with a long, straight, terminal, spreading awn; inner smaller, membranous, awules. Stam. Filaments three, short, capillary, deflexed; anthers oblong, marinate, pendulous. Pjê. German small, roundish, superior; flyles two, short; stigmas feathery, oblong. Peric. none, except the permanent corolla. Seed solitary, invelled with the corolla, but not united to it. The terminal florbe is imperfect, but both valves are awned.

**Eff. Ch. Calyx of two valves, three-flowered. Corolla of two unequal valves; the outermost abrupt, awned. Central florbe imperfect; both valves awned.**

1. *T. villosus*. Villous Four-bearded Grains. Willd. p. 1. Desfont. Atlant. v. 2. 389. t. 235.—Gathered by Des- fontaines in sandy ground in Barbary, near Casas. The stem is crested, about a foot high, knotty, leafy, a little compressed, smooth. Leaves linear, smooth, narrower than their long sheaths, of which the uppermost, in particular, is much inflated, embracing the bafe of the spike, which resembles that of a *Polygania*. (See that article.) The flowers are sepallate, disposed in four ranks, on a slender zigzag common stalk, or receptacle, their couious yellowish awns about half an inch in length, spreading every way. The outer valve of the corolla is clothed with couious soft spreading hairs.

**TETRAPOLIS**, in Ancient Geography. See CARPATHOS.

**TETRAPOLIS**, Attica, the name of a country of Greece, N. of Attica; in which, according to Strabo, were four towns built by Xanthus, when he reigned in this district of Greece; whence its name, from τετρα, four, and πόλις, city.

**TETRAPOLIS**, Dorica, a country of Greece, in the Do- ride, between the country of the Etolians and that of the Epirotes, according to Strabo.

**TETRAPOLIS**, Syria, a country of Asia, in Syria, according to Strabo; it contained four principal towns, which had the fame founder.

**TETRAPTORTE, TETRAPTONTON**, in Grammar, a name given to such defective nouns as have only four cases; such are *alias*, &c.

**TETRAPYRAMIDIA**, derived from *τετρα* and *πυραμις*, a pyramid, in Natural History, the name of a genus of Spars.

The bodies of this genus are spars influenced in their shape by an admixture of particles of tin; and are found in form of broad-bottomed pyramids of four sides.

Of this genus there is only one known species, which is usually of a brownish colour, and is found in Saxony; also in Devonshire, Cornwall, and other counties of England, where there is tin. Hill.

**TETRAPYRIA, in Ancient Geography, a town of Cappadocia, in Galatia.—Allo, a town of Africa, upon the coast of Marmara, before Portus-Phuces, according to Strabo.**

**TETRARCH, TETRARCHA, τετραρχή, formed of *τετρα* and *ριχί*, ruler, dominion, a prince who holds and governs the fourth part of a kingdom.**

Such, originally, was the import of the title *tetarch*; but it was afterwards applied to any petty king or sovereign; and became synonymous with *tetrarch*, as appears from the follow-
following considerations: 1. That Pliny makes mention of six tetrarchies within the cities of Decapolis. 2. That Herod's kingdom was only divided into three parts, which yet were called tetrarchies, and the sovereigns of them (Luke, iii. 1.) tetrarches. 3. Jof. pl. Antiq. Jud. lib. xiv. c. 23. tells us, that, after the battle of Philippus, Antony, going into Syria, constituted Herod tetrarch; and on medals the name Herod is called *alphane.*

**TETRARRHENA,** in Botany, so named by Mr. R. Brown, from τετραρχής, and αὐτός, male, on account of the very remarkable character in this tribe, the grasa, of the four stamens, which Mr. Brown says he has ascertained by repeated examination.—Brown Prodr. Nov. Holl. v. 1. 229.


The inflorescence is a simple, equal, somewhat racemose spike. Flowers awnless.

1. T. *distichophylla.* Two-ranked Tetrandrous Grasfs. Br. n. 1. (Ehrh. distichophylla; Labill. Nov. Holl. v. 1. 90. t. 117.)—Flowers downy. Corolla ribbed, obtuse; the outermost valve half the length of the rest. Leaves straight, hairy as well as their fissures. Stem branched at the base.—Native of Cape Van Diemen. The stem is hardly a foot high, with many erect leafy branches. Leaves lanceolate, acute, about an inch long, moderately spreading in two ranks. Spike solitary, falked, terminal, erect, about an inch in length, simple, the flowers almost all fertile, spreading in two rows.

2. T. *acuminata.* Pointed Tetrandrous Grasfs. Br. n. 2. —"Flowers smooth. Corolla ribbed; the other glumes acute; one valve rather shorter than the inner glumes; the other longer, with a taper point. Leaves and their stems smooth. Stem branched."—Found by Mr. Brown in the same country.


**TETRASARIUS,** a word used by some of the medical writers, to express half an ounce.

**TETRASPASTON, τετραπαστών, in Mechanics, a machine in which there are four pulleys.** See Pulley.

**TETRASTATER, τετράστατερ, in Ancient Coinage,** a Grecian gold coin of Lythmachius, Antiochus III. and of some of the Egyptian monarchs. It was the quadruple chruso (ΧΧΧΧΧΧΧΧ), weighing about 530 grains, and current for 80 drachmas of silver, valued at about 34, now worth 34 florin. Some weigh 540 grains, which may be owing to the gold of such being of more alloy; though it may well be questioned, says Pinkerton (Medals, vol. 1.), if they were ever meant to relate to the Attic standard.

**TETRASTICHTH, τετράστικθ, a fanzana, epigram, or poem, confisting of four verses.**

**TETRASTOECHON, in Botany,** a term often used by the Greek writers, and generally misunderstood by those who copy their accounts. Pliny has made an error in the description of the euonymus, which has confounded two different shrubs together ever since, by mistaking the sense of this word, used by Theophrastus, in his account of it. He says, that the fruit is divided within into four orders or series of seeds; this he expresses by the word *tetrasaxon,* which Pliny, supposing to be the same with the word *tetrasconom,* has translated into *granum quadrangulum.*

But this is by no means the sense of the word which was used by the Greeks, to express that a thing had *τετράσκοι,* four rows, orders, or series of seeds in it; nor does it at all express the seeds being square, much less its being single, for the original derivation of the word was from the term *τετράσκοι,* used in dances. These were composed of several series of perfons, called *τετράσκοι,* *fakaiki;* and every fhecon consisted of several perfons, who all moved together. See Eunynmes.

**TETRASTYLE,** formed from *τετράς,* four, and *στυλος,* column, in the Ancient Architecture, a building, and particularly a temple, with four columns in its front.

**TETRASYLLABICAL,** a word confisting of four syllables.

**TETRATHECA,** in Botany, received that name from the writer of the present article, in allusion to the four cells of its anthers, the word being compounded of *τετράς,* and *θηκη,* a cæph, or cell. Mr. Brown indeed, in his General Remarks on the Botany of Terra Australis, p. 12, offers some observations tending to invalidate this name and character. But it appears to us, that they both derive confirmation from the confideration, of which we are well aware, that most anthers have four cells when young, though, as they burst lengthwise, the partition of each cell is obliterated. Whereas the peculiarity of our *Tetrapheca,* admitted by our intelligent friend, confines in the four cells remaining unaltered, because the pollen is discharged by a terminal tube or orifice; nor is it of any great consequence that he has found, in some species, the partition to be obliterated, in an advanced state of the anthers. *Ceratopetalum,* for example, is a good name and a well-marked genus, though there is a species distinct of petals. With respect to the natural order, and the situation of the singular appendage to the seed, in the genus before us, we gladly profit by Mr. Brown’s correction, hoping to be pardoned, though we may have made several false steps, in the totally strange wildernes of New Holland plants, which we were among the first, without any guide, to attempt to lay open to botanists. —Sm. Bot. of New Holl. 5. Exot. Bot. v. 1. 57. Wild. Sp. Pl. v. 2. 321. Air. Hort. New. v. 2. 347. —Clafs and order, Oistandria Monogynia. Nat. Ord. akin to Polygonas, a new order to which Polygona is referred; but in Mr. Brown’s opinion conftituting, along with another genus, a still different order, which, from the name defined for that genus, he chooses to denominate *Tremandres,* of which we propose to treat in its proper place.

Gen. Ch. Col. Perians inferior, in four deep equal segments, deciduous. Cor. Petals four, obovate, equal, many times longer than the calyx. Stam. Filaments eight, inserted into the receptacle, very short, equal, erect, simple; anthers terminal; oblong, somewhat curved, much shorter than the corolla, with four longitudinal furrows, and as many cells, and terminating in a simple tubular beak, through which the pollen is discharged. Pffl. German inferior, very small, obovate, compressed; style vertical, cylindrical, simple, hardly to long as the anthers; stigma simple. Peric. Capsule obovate, compressed, of two cells and two valves, the partitions from the middle of each valve. Seeds one or two in each cell, oval, pendulous, with a naked spur, but crowned, at the opposite end, with a twisted crest.
TET

Eff. Ch. Calyx four-cleft, inferior. Petals four. Anthers beaked, with four cells. Capsule of two cells and two valves, with partitions from their seeds. crested, about two in each cell.

1. T. juncea. Rushy Tetramerica. Wild. n. 1. Ait. n. 1. Sm. Bot. of New Holl. 5. t. 2.—Smooth. Leaves alternate, lanceolate. Stem with sharp angles. Branches elongated, and almost naked. Native of New South Wales, from whence we received drawings and speciments, through the hands of Dr. John White, soon after the settlement of the colony there. This plant was sent to Kew, by Mr. Peter Good, in 1803, and it is marked as flowering in July and August, being kept in the greenhouse in winter. The root is woody, small, perennial. Stem somewhat thorny, much branched even from the base; the branches long, slender, very acutely angular, so as to be almost winged, leafy, smooth like every other part. Leaves generally few and small, acute, serrate, entire, with a strong mid-rib. Stipulae none. Flowers scattered along the branches, on simple solitary red flasks, about an inch long, each from the bottom of a diminished leaf, and making a very elegant appearance. The calyx is red. Petals crimson or rosy-coloured, three-fourths of an inch long. Anthers purple-brown, tipped with yellow. We have a variety with white petals, the calyx and flasks of which prefer their usual colour.

2. T. ericifolia. Heath-leaved Tetramerica. Sm. Exot. Bot. v. 37. t. 20.—Leaves whorled, linear, revolute, minutely toothed. Stem rough with ascending bristles. Flower-flasks and calyx very smooth. From the same country as the foregoing, and tent, with drawings, at the same time. This is of more humble growth than T. juncea, and much more leafy. The leaves are four, five, or more, in each whorl from top to bottom of the stem and branches, filiform, narrow, about half an inch long; their edges, and sometimes their inner surface, near the point, rough with minute teeth. Flowers rosy-coloured, drooping, about half the size of the foregoing, on simple, solitary, axillary flasks, as long as the leaves. Anthers purple, with yellow tips, badly represented by the engraver, who mistook the original drawing of the section of an anther, for the german, and altered it accordingly. Capsule ovate, emarginate. Seeds with a small white crest, mostly two in each cell.

3. T. glandulosa. Glabrous Tetramerica. Sm. Exot. Bot. v. 1. 1. 39. t. 21.—Leaves imperfectly whorled, lanceolate, revolute, toothed with little spines. Stem downy. Flower-flasks and calyx rough with glands.—Sent intermixed with the last, from New South Wales. The speciments of both appeared to have been burnt down to the ground, probably by fires made by the savages in the woods, and had grown up again; which proves them to be perennial plants, though scarcely thorny. The base of the present species, and its general aspect, agree with T. ericifolia, but the corolla and anthers are of a darker tint. The stem is clothed with very short close down. There is no means briskly, while the flower-flasks and calyx, instead of being smooth, are covered with glandular hairs. The leaves are rather broader, and less whorled, being often merely opposite, or even diverged.

4. T. thyssifolia. Thyme-leaved Tetramerica. Sm. Exot. Bot. v. 1. 41. t. 25.—Leaves whorled, lanceolate, toothed with little spines. Stem, flower-flasks, and calyx rough with ascending bristles.—From the same country. Rather larger than either of the two last, and readily distinguished, at first sight, by its broader leafy revolute leaves. The bristly hairs clothing the flower-flasks and calyx are its peculiarly distinguishing character. The flowers are of a fine crimson, with violet anthers, whose tips are yellow. Few genera are more peculiar, or more elegant, than Tetrathera, and the species are all worthy of a place in our collections.

TETRATONON, is the Greek name of an interval of four tones; which in modern music is usually called the superluous or sharp fifth.

TETRAX, in ornithology, the name of a bird of the orto or bulbul kind, called by some authors anas campyrfcis, or the field-duck, and also little bulbul; and by some others, the canna. See Ortis.

It is a very common bird in France, where it is called canne patiere: it is called anas, from its sitting on the ground, just as the duck does on the water. It is of the size of a pheasant, and has a beak like that of the common hen. It is taken with nets, as the partridge: it runs very swiftly, and, like the bulbird, has no hinder toes. Its belly is white, and its back is variegated with grey, red, and black. It feeds on vegetables, and on small insects.

TETREUMA, in botany, a name given by the people of Guinea to a species of shrub, very common among them, and used to cure whittows. They dry the leaves, and reduce them to powder; and, moistening them with any liquor, apply them to the place. Petiver has called this arbor Giumenzt lauretini foecie, from its great likeness to the common shrub which we call the laurultine. The leaves are obscure and full, and are an inch and a quarter broad, and two inches and a half long. These hand alternately on all sides of the flalk, and are fixed on short pedicels. The flowers grow out of the bosoms of the leaves, and stand in clusters in the manner of thole of the common laurultine. Phil. Trans. N. 232.

TETRICA, in Ancient Geography, a town of the Sabines, placed by Varro in the environs of Mount Ficellus, which lay northward. Servius on Virgil says, that it belonged to Picenum, because in his time, its limits had been changed. Le Abbé Châpe places it where we now find Leonella. There we find the terrible rocks, horrentes rupe, mentioned by Virgil.

TETRICUS MONS, a fraggy mountain of Italy, in the country of the Sabines. Pliny.

TETRINA, in Geography, a town of Ruffia, in the government of Archangel, near the White sea; 100 miles N.N.W. of Archangel.

TETRIX, in Ornithology, a species of tetra; which see.

TETRODON, in Ichthyology, a genus of the Branchiostegi order of fishes, according to the arrangement of Gmelin; the characters of which are, that the jaws are long, divided at the tip; the branchi or gills have a linear aperture; the body is roughened beneath, and the ventral fins are wanting. The fishes of this genus, like the Chidon, have the power of inflating their bodies at pleasure, by means of an internal membrane, and during this time the small spines of the sides and abdomen rise to as to be a defence against their enemies. They live principally on crustaceous and teelaceous animals. Gmelin enumerates thirteen species.

SCELERATUS; the Noxious Tetrodon. Tetragonal, with very large head; length two feet or more. Found in the American and Pacific oceans, and considered as highly noxious, producing, when eaten, very severe symptoms.

TESTUDINEUS; a Tortoise-shelf Tetrodon. Abdomen plane, smooth, and back with white curved futures; length two feet; colour rufus-brown above, marked by numerous round pale blue spots; beneath blueish or ash-coloured, beautifully varied by longitudinal brown streaks; fins and tail bright ferruginous; the whole abdomen is furnished with numerous small spines, which, when the animal is undisturbed, are imbedded in corresponding cavities in the skin,
but elevated, when the fish is alarmed and disturbs its body.

Lagocephalus; Hare Tetrodon. Abdomen aculeated; smooth body, and prominent shoulders; length twelve inches; thick in front; hinder parts tapering suddenly towards the tail; color above yellowish-brown, beneath whitish with a silvery cast; across the back marked with short, black, or dark-brown bars, and over the sides with many, scattered, round, blackish spots; sides and abdomen befit with radiated spines; fins small, and tail slightly rounded. Found in the Indian and American seas; and straying into northern latitudes, are taken about the British coasts. This fish has the power of inflating the abdomen to a large size; and derives its name from the resemblance of its head to that of a hare.

Linearus. With brown and pale bands; length ten or twelve inches, square shape; and when inflated, like the tail; body befit with small spines; color grey on the abdomen, with longitudinal, deep-brown streaks; fins and tail as in the last species. Found in the Indian and American seas, and also in the river Nile.

Eleutherius. With red, green, and white spots; above brown, and beneath sea-green; yellow at the sides, and green fins; length seven or eight inches; eyes large, with red circles. Found in the Indian and American seas, among coral rocks; and when touched with the hand, affecting it with an electric or galvanic shock.

Ocellatus. Ocellated on the shoulder-band; length fix or eight inches; thick, ovate shape, contracting towards the tail; color deep green above, paler on the sides and abdomen, which are whitish; across the middle of the back, as far as each pectoral fin, a broad black crescent, edged with yellow; dorsal fin situated on a round black spot with yellow edges; lateral line from beneath the eyes to the tail, which is small and roundish; under parts befit with many spines. Found in the Indian seas and adjoining rivers, particularly those of China and Japan; very poisonous in its nature, and it is proscribed to be eaten under very severe penalties by the emperor of Japan.

Spengleri. Head bearded with many cirri; lengthened shape; above brown-coloured, with roundish deep brown spots; abdomen tumid, whitish, and befit with small spines; with cirri or soft prominences differed about the upper parts of the body. Found in the Indian seas, ten or twelve inches in length.

Hankenii. With lower jaw longer than the upper; length eight or ten inches; like the former in general appearance; above brown-coloured, with small whitish clouds or spots; beneath whitish, with small spines. Found in the Indian seas.

Oblongus. Oblong, with equal jaws; length six inches; lengthened shape; color grey, with grey back, marked by many semi-decurrent brown bands; fins and tail cuneate; two lateral lines, one near the back, the other near the abdomen. Found in the Indian seas.

Rostratus; Snouted Tetrodon. Both jaws elongated to the back; length a few inches; oblong-ovate shape, contracting towards the mouth and tail; finnot lengthened and slightly tubular; color blueish-brown, beneath whitish; fore-part of the abdomen befit with spines, few over the back; fins brown. Found in the Indian seas.

Levigateus; Smooth Tetrodon. With the abdomen aculeated in front; a large species; blueish above, with two white stripes on each side; under parts white; from the mouth to the end of the pectoral fins aculeated; the other parts being smooth. Found in the American seas.

Hispidus. Entirely hispid, with brilly papilla; length two feet; shape, when inflated, like that of T. lagocephalus; color whitish; upper parts marked across the back by three or four semi-decurrent brown bands; whole body befit with small spines. Found in the Mediterranean and Indian seas. Small remains of this species are said to occur among the petrifications of mount Bocca near Verona.

Mola. Unarmed, sharp, compressed, rounded; a very short rounded tail; dorsal fin annexed to the anal, with oval spines. (See Sun-fish.) Dr. Shaw has made a distinct genus of the fun-fish under the name of cepalus, the characters of which are, that the jaws are bony, and body terminating abruptly, so as to resemble the head of a fish. This genus comprehends the mola, or short fun-fish; the oblong fun-fish, with truncated body, or oblong diodon of Pennant (see Sun-fish); its variegated, with whitish undulations and spots; and the Palladian C. or silvery fun-fish, with brownish back, and spiny carinated abdomen. The mola, or short fun-fish, is a native of the European seas. Its general colour is brown, with a silvery cast on the sides and abdomen; the skin rough; the pectoral fins small, rounded, and placed horizontally; the dorsal and anal fins placed opposite, and of a lengthened shape, with rounded tips continued into the tail-fin. This fish is sometimes seen lying on its side, on the surface of the water, when it may be safely taken. In the Northern seas it arrives at a vast size, of the length of eight or even ten feet, and 500 pounds in weight; it is supposed to feed principally on shell-fish, and in the night it is said to exhibit a high degree of phosphoric splendour.

Of this there is a variety, vis. the truncatus, unarmed, smooth, compressed, oblong, with a very short tail, the dorsal and anal fins annexed, with lunated spines. This is the oblong fun-fish of Pennant.

Stellatus; Spherical Grey Tetrodon. Whitish beaith, with the body befit with radiated spines; the tetrodon etoile of Cepede. Length twelve or fourteen inches; shape, when inflated, nearly spherical; color greenish, deeper on the back, marked with dusky specks; under parts whitish; vent surrounded by a black circle; whole body covered with small fimbriated or radiated spines; dorso-fin rounded at the tip, and attached at the base by a kind of footstalk; tail oval. Found in the Indian seas. Shaw.


Meleagris; Pintado Tetrodon. Brown, speckled with white. Found in the Indian seas, and when taken, making a kind of grunting noise, like several others of this and neighbouring genera.

Tetschin, or Tetzin, or Dietrichin, in Geography, a town of Bohemia, in the circle of Leitmeritz, on the river Elbe; 15 miles N. of Leitmeritz. N. lat. 50° 46'. E. long. 14° 17'.

Tetsi, a town of Thibet; 27 miles E. of Lasa.

Tett, a place now in ruins, situated to the south of Azaamor, on the northern extremity of the bay of Mazagan, in the empire of Morocco; the name signifies in Arabic Titus, and is therefore supposed to denote the ruins of Titus, founded by the Carthaginians.

Tetter, a diffease among animals, which is of the ring-worm kind, and which runs or spreads itself upon the skin in different directions, whence probably it has received the name. It attacks different parts, but is most commonly met with on and about the rump, not unfrequently running down upon the joints of the tail for some distance.

It is of a scabby itchy nature and appearance, and when neglected,
neglected, is said to have sometimes become of the quality of canker, in some sorts of animals. In cases where it fixes upon the more flaky parts of the bodics of the animals, it is often attended with such troublesome itchings, as to cause them to rub themselves against posts, walls, and other places, until they rub off and destroy the very hair and skin of the parts. Nay, the animals will, it is said, sometimes even tear off the flesh with their teeth, if they can come at the parts.

The cure of the disease may most readily be accomplished by the use of a ball composed of half a drachm to a whole one of calomel, or more, according to circumstances, in union with some sort of cooling purgative powder; or a powder constituted of crude antimony, sphazia mineral, and cromer of tartar, of each about half an ounce; which should be given once or twice a day in a quart of oat-meal gruel. At the same time, washing the parts well with Goulard water, and afterwards applying a little of an ointment composed of sulphur, blue ointment, and hog’s-lard to them.

The animals should be well taken care of while the cure is going on.

TETTIGES, &c. grasshoppers, in Antiquity, a title the Athenians affixed to themselves. See GENEREES.

TETTIGOMETRA, in Entomology, a name by which the ancients called the nymph of the cicada, or tetta; and they named this nymph, from which they frequently saw that they hatched, tettigometra, which signifies the mother of the cicada. See Harvest-Fly, Cicada, and Vegetable-Fly.

TETTIGONIA, a word used by the ancients to express the smaller species of cicada, with which they were acquainted. They called the larger acrita.

It is generally supposed, that the tettigonia was the name with our smallest kind, called by the French cicalon; but M. Reamur observes, that as the ancients knew two kinds of the cicada, we know three; and that our middle one seems to have been their tettigonia or small cicada, and that they were not acquainted with our smallest kind, or cicalon, which is not larger than a hornet.

TETTIGONIAE of Linnaeus. See GRYLLUS. TETTIGONAE of Fabricius. See CICADA.

TETINANG, in Geography, a town of Germany, and principal place of a lordship of the same name, united with Montfort, ceded to Bavaria by the peace of Presburg; 8 miles N. of Lindau.

TETTOVA, a town of European Turkey, in Macedonia; 13 miles W. of Skopias.

TETTUA-MOTU, a cape on the E. coast of New Zealand, the N.E. point of Poverty bay. N. lat. 38° 36'. W. long. 181° 30'.

TETUAN, Tetawan, or Tetreg, a town of Africa, in the empire of Morocco and province of El Garb, situated near the river Bafega, about a league and a half inland from the Mediterranean, and inhabited by Moors and Jews; who, for the most part speak a corrupt Spanish, in which language their commercial negotiations are transacted. They are gentry in their persons and polite in their manners. The environs of Tetuan are planted with vineyards and gardens, which are kept in good order, and which produce more excellent fruits than those in other parts of the empire. From the raisins and figs the Jews distil an ardent spirit (called Malaya), which, at the age of a year, resembles the Irish uiscebaugh, and it is preferred to English brandy and rum. Of this they drink immoderately, and generally take a glass before eating. Leo Africanus attributes the foundation of this town to the people of Africa. It was afterwards embellished, and the population increased, when the Moors were driven out of Spain. This was the place of residence for many of the confuls of the European powers, till the year 1770, when the reigning emperor, Seedy Mahomed, would not longer permit them to remain, nor again to establish themselves in the place. The port of this town has kept a trading communication with Gibraltar, whence the ships come to visit, when the wind is in the west, and does not allow them to make Tangiers. The shore of Tetuan is only safe when the wind is in the west, at which time ships ride securely; but when it veers to the east, they must remain here no longer. Our fleets often visit and water here, and this was the cape with that of the immortal Nellon, previously to his victory in Aboekir bay. Tetuan is said to contain 16,000 people; 30 miles S.E. of Tangiers. N. lat. 35° 30'. W. long. 5° 20'.

TETYAN HEAD, a cape on the W. coast of the island of Mindanao; near which is a harbour that may be entered without danger. N. lat. 7° 20'. E. long. 124° 36'.

TEVAKUN, a town of Perua, in the province of Khosfan; 45 miles E.S.E. of Meshehdi.

TAVARA, a town of Naples, in Capitanata; 5 miles N.E. of Volurnara.

TEUBER, or TEUBERINN, ELISABETH, in Biography, a celebrated German opera singer, and Ælve of the famous Tefi. She was chiefly attached to the court of Vienna, where she resided in 1772. She had sung at Naples in 1769 with great applause; but was peremptorily ordered by her physicians never to sing again. Her health had been so much impaired in Russia, where she had remained three years, that the whole faculty was unanimous in pronouncing that the exercise of her profession would be fatal. However, in spite of this prediction, she afterwards recovered her health and voice sufficiently, in a journey to Italy, to appear again on the stage at Naples in 1785; where, finding that her voice had somewhat lowered its pitch, she performed the principal man’s part in contrasto, to the entire satisfaction of the public. She was the daughter of a famous violinist in the emperor’s service; she had lessons in singing from Haffe, in acting from the Teii, and often sung in the operas of Haydn at Eterhazri.

TEUCHERIN, in Geography, a town of Saxony, in Thuringia; 18 miles S.W. of Leipzig.

TEUCHIT, in Botany, a name used by some for the scoenanth or schoenanth, camel’s-hay, which ought to be written teuchitis. There is a city Teuehis in Egypt, near the borders of Arabia, and the geographers all mention a lake in the neighbourhood of this city; in this lake it is probable the scoenanth might grow; and being gathered there, and sold in the adjoining city of Teuehis, the purchasers might distinguish it with an epithet formed of the name of the place where they bought it. See Scoenanth.

TEUCHTLACOT-ZANHQUI, in Zoology, a name by which the natives of some of the American nations call the ratte-finale.

TEURCRIUM.


Gen. Ch. Cat. Inferior inferior, of one leaf, cloven half way down into five acute, nearly equal, segments, gibbous on one side at its base, permanent. Cor. of one petal, ringent. Tube cylindrical, short, ending in an incurved throat. Upper lip erect, acute, divided throughout into two distant segments, divericated towards each side: lower spreading, three-cleft; its lateral segments resembling the upper lip, nearly erect; the central one rounded, and very large. Stam. Filaments four, awl-shaped, longer than the upper lip of the corolla, ascending, curved, prominent between its divisions; anthers small, incumbent. Pyl. Germen superior, deeply four-lobed; style thread-shaped, agreeing with the flaments in size and position; it has two, slender, acute. Peric. none, the unchanged calyx containing the seeds in its concave base. Seeds four, rounded, reticulated or wrinkled.

Eff. Ch. Upper lip of the corolla deeply divided, beyond its base, divericated. Stamens prominent.

Obf. The upper lip of the corolla being fo deeply divided, even below its base, into the tube itself, and its segments so far asunder, there seems to be no upper lip at all. The latter however is more truly the cafl in Ajuga, to which, and not to Teurcrium, belongs the Chamapitys of Tournefort; its upper lip being, in a manner, cut away. Teurcrium of Tournefort has a bell-shaped calyx, and the middle segment of the lower lip of its corolla concave. Polium of the same author has its flowers collected into dense terminal heads. His Chamapitys has axillary flowers, and a tubular calyx. Alurnum of Bochart has thyme-like leaves, and a peculiarly pungent smell. Scordium of Ray and Rivinus has the odour of garlic. Ioa of Dillenius has the calyx very protuberant at the lower part. All these nevertheless form together a most natural and well-defined genus, whose qualities are more or less aromatic or bitter; its habit usually herbaceous, mostly perennial, often shrubby; leaves opposite, simple, though in some instances much divided; pubescence various, but hardly ever absent; flowers blue, red, yellow, or white, axillary, solitary or whorled, panicked or capitulate; their incurved flaments and style always very conspicuous between the divisions of the upper lip.

Thirty-five species are enumerated in the fourteenth edition of Linn. Syll. Veg. from which Chamapitys, Ioa and falcefolium are to be removed to Ajuga. Willdenow, after making these deductions, has sixty-four. He follows Schreber and others, in making many more species out of the allies of Polium, than Linnaeus would ever allow to be more than varieties. Two new ones from Crete are added in the Prodr. Fl. Gracc. The genus is generally European, but not entirely so, and for the most part inhabits warm sunny climates. No attempt has been made to distribute it into sections. We shall indicate some traces of such, as we select the more curious or remarkable species for illustration, describing all the Britth as well as the new ones.

T. campanulatum. Bell-shaped Germander. Linn. Sp. Pl. 786. Wild. n. 11. Ait. n. 6. (T. lupinum, perenne, palustre, apulum, glabrum, folii lacinia, flore albo; Till. Pfl. 163. t. 49. f. 1.)—Leaves many-cleft, nearly smooth. Flowers axillary, solitary. Calyx awned. Stem procumbent. Native of moist situations, in Italy and the Levant. Miller appears to have cultivated it in 1728, but the true plant is now scarcely to be seen in our gardens, and is little known to botanists. The synonym of Tilli has no right to be marked as a variety, answering exactly to the Linnaean specimens and description, nor do we find any other figure of this species. Schreber seems to have missed Willdenow, to quote a synonym of Rivinus, which has no existence. This we find transcribed into Hort. Kew, with a correction of t. 14 for 24; though nothing but T. Botryz is there to be seen. No lea6s incorrectly is Rivinus, t. 19, cited by Willdenow, after Schreber, for T. orientale; as Dr. Sims has noticed in Curt. Mag. 1779. T. campanulatum is a very distinct, perennial, herbaceous, nearly smooth, species, whose "fles" are square, leafy, more or less prostrate and creeping. Leaves an inch long, twice-three-cleft, with bluish, notched, slightly revolute segments. Flowers axillary, solitary, opposite, spotted, with a large, bell-shaped, rather pungent-pointed, calyx. The corolla is said to be white.

T. levigatum. Smooth Yellow Germander. Vahl Symb. v. 1. 40. Willd. n. 2.—Quite smooth. Lower leaves many-cleft; upper three-cleft, entire. Flowers axillary, solitary. Segments of the calyx oblong, without awns.—Gathered at Monte Video, by Commerson, whose specimen is before us. This species is larger in all its parts than the foregoing, and appears to be herbaceous and erect, quite smooth, except a slight downiness, here and there, upon the young branches or flanks. Leaves flat, an inch and half long, deeply divided into three wedge-shaped, jagged, blunt, very smooth and flat, lobes; the upper, or floral, ones much smaller and narrower, simply three-cleft. Flowers yellow. Segments of the calyx oblong-lanceolate, with one central rib and two marginal ones, acute, but not tipped with any awn or bristly point.

T. orientale. Great-flowered Germander. Linn. Sp. Pl. 786. Wild. n. 5. Ait. n. 2. Curt. Mag. t. 1729. (T. orientale angulifolium hircinatum, flore magnro subcaruleo; Com. Mem. 23. 1. 25.)—Leaves deeply three-cleft, many-cleft, linear. Clusters terminal, compound. Flower-flanks horizontal, longer than the floral leaves.—Native of the Levant. Cultivated by Miller, and recently restored to our gardens by seeds obtained from Siberia, by Mr. Lodigges. The root is perennial. Several decumbent branches from the root bear leaves divided into many linear segments; but the foliage of the erect panicked flowering stem is doubly three-cleft below, simply above. Inflorescence terminal, racemo, compound, with small bracteaceous leaves. Flowers numerous, almost as large as those of T. fruticos hereafter described, of a light purplish-blue. All the herbage, and even the corolla, is hairy or downy. We have already mentioned, under our first species, that the citation of Rivinus by Willdenow is an error.


T. trifidum. Trilid-leaved Germander. Retz. Obs. facic. i. 21. Willd. n. 7. Ait. n. 5. (T. capato; Thunb. Prodr. 95.)—Leaves hoary, in three deep linear segments. Stalks axillary, three-flowered. Calyx hoary, without awns.—Gathered at the Cape of Good Hope, by Thunberg and Maffon. The latter sent seeds to Kew in 1791. The plant is shrubby, flowering most part of the summer, and kept in the greenhouse in winter. Its aspect is not unlike Winter Savory, but more hoary. The segments of the leaves
Leaves are an inch long, revolute, entire. Flower-stalks half the length of the leaves. Segments of the calyx elongated, lanceolate, revolute, single-ribbed, bluntly pointed, not awned. Corolla purplish. Seeds with a net-work of wrinkles over their surface.

T. Pseudo-chamoepitys. Racemose Slender-leaved Germander. Linn. Sp. Pl. 787. Willd. n. 8; excluding the synonym of Chamus. (Chamepitys alta; Camer. Epit. 680. Chamepitys purpure alterius altera icon; Dod. Pempt. 47.)—leaves deeply once or twice three-lobed, linear, acute, revolute, hairy. Cluster terminal, simple. Bracteas three-lobed. Calyx hoary, awned.—Native of Spain, Barbary, and the south of France. The flum is shrubby, divided from the bottom into many ascending, leafy, square, softly hairy branches. Leaves in very narrow, somewhat awned, segments, more or less hairy. Flowers much like those of T. orientale, but forming a simple terminal calyx at the top of each branch, with deeply three-lobed linear bracteas, usually as long as the flower-stalks. Lip of the corolla externally hairy. The Pseudo-chamoepitys of Clau. Hilt. v. 2. 185. Lob. f. 385. f. 1. Chamepitys purpure altera; Ger. Em. 526; the left-hand figure in Dode. Pempt. 47; all from the same wooden block; appears to us a different species from the above-deferibed, with which we are unacquainted. There can be no doubt that the T. mauritanum, Linn. Sp. Pl. 787, entirely adopted from Shaw's rude figure, n. 575 of his Phyt. Afric. Specimen, is exactly the same with the real Pseudo-chamoepitys of Linnaeus, which we have from Spain and Barbary, and which the cut of Camerarius, as well as the right-hand one of Dodonaeus, clearly represents.

All the foregoing species, with a few more which may be found in Linnaeus and Willdenow, apparently constitute a fiction of the genus before us, whose deeply-divided foliage gives them a peculiar and striking character. Their inflorescences differ considerably, and on a more careful examination it will be found, that the racemose blue-flowered ones are most naturally akin to the T. fruticans, notwithstanding its undivided entire leaves; while the others are more related to some cut-leaved red-flowered species, with which we shall meet hereafter; inasmuch that no natural subdivision of this genus could be founded on the above character.

T. fruticans. Blue Tree Germander. Linn. Sp. Pl. 787. Willd. n. 9. Ait. n. 6. Sm. Fl. Græc. Sibth. t. 527, unpublished. (T. latifolium; Linn. Sp. Pl. 788. Curt. Mag. t. 245. T. fruticans baccicum; Clau. Hilt. v. 1. 348. Dill. Elth. 379. t. 284. T. baccicum; Ger. Em. 659.)—Leaves ovato-lanceolate, entire; snow-white and cottony beneath. Flowers axillary, solitary. Segments of the calyx ovate, cottony at the base.—Native of the south of Europe and north of Africa. A hardy and common greenhouse plant in England, sometimes bearing our milder winters in the open air, especially near the sea. The flum is shrubby, bulky, three or four feet high, with straight, divaricated branches, clothed, like the backs of the leaves and calyx, as well as all the stalks, with peculiarly white, soft, dense down. The leaves vary in size and breadth, as may be seen in the plate of Dillenius, whose fig. 368. milked Linnaeus to make a species, by the name of latifolium, which is but a trifling variety. The upper surface of the leaves, and inside of the calyx, are dark-green, usually quite smooth. Flowers large and handsome, of a fine blue, coming out at all times of the year; the middle segment of their lower lip sometimes deeply cleft.

T. brevifolium. Short Hyssop-leaved Germander. Schreb. Vertic. Unilab. 27. Willd. n. 16. Sm. Fl. Græc. Sibth. t. 528, unpublished. (Resmarinum rectedias face; Alpin. Exot. 103. t. 102. Polio retto di Candia; Pon. Bald. 156.)—Leaves lanceolate, revolute, entire, obtuse, hoary. Flowers solitary. Calyx without awns.—Native of rocks in Crete, near the sea-shore. The flum is shrubby, with copious spreading, square, leafy branches. Leaves about an inch long, of a hoary green on both sides, veiny. Flowers on slender, solitary, simple stalks, from the bosoms of the upper leaves. Corolla bluish-coloured, with purple veins. Segments of the calyx revolute and bluish. Schreber and Willdenow cite, under this species, T. fruticans, rectedias arabicus folio et facie; Tourn. Cor. 14. Rivin. Monop. t. 20; which is correct as to Tournefort, but no such thing occurs in Rivin. If we had not consulted, in Sir Joseph Banks's library, the most perfect copy of his work known to exist, we should not speak so decidedly on this head.

T. creticum. Rosmary-leaved Germander. Linn. Sp. Pl. 788. Willd. n. 11. Sm. Fl. Græc. Sibth. t. 529, unpublished. (T. hyssopifolium; Schreb. Vertic. Unilab. 28.)—Leaves linear-lanceolate, revolute, entire, obtuse; white and cottony beneath. Flowers often two or three together. Calyx cottony, spinous.—Native of Crete, Cyprus, and Egypt. A taller, larger flum than the last, some of whose synonyms were confounded with it by Linnaeus. Its habit and foliage much resembling Rosmary. The flowers are light purple, or pink, and form long leafy calyxes, at the ends of the branches, being either solitary, or two or three together, on short downy stalks, from the bosoms of the upper leaves. The calyx is cottony without; green within; and has short spinous points.

T. Marum. Marum Germander, or Cat-thyme. Linn. Sp. Pl. 788. Willd. n. 12. Ait. n. 7. (Pseudo-Marum; Rivin. Monop. Int. t. 13, not t. 40, which is Thymus Mal- tichina. Marum Cortuli; Bauh. Hift. v. 3. 242.)—Leaves ovate, acute, entire, falked, cottony beneath. Flowers racemose, in pairs, turned one way. Calyx woody.—Native of Spain, and the isles of Hyeres. Frequent in greenhouses, where it is very hardy, being cultivated for the sake of its peculiarly pungent scent, which powerfully induces fæezing, and which renders it not less grateful to cats than Valerian. The flum is bulbous, of humble growth, with round hoary branches. Leaves a quarter of an inch long, of a hoary green on the upper side. Flowers crimson.

T. quadratulum. Little Square-leaved Germander. Schreb. Vertic. Unilab. 36. Willd. n. 13. Sm. Fl. Græc. Sibth. t. 530, unpublished. (T. ramossifolium; Desfont. Atlant. v. 2. 4. t. 118.)—Leaves ovato-homphoid, deeply toothed; cottony beneath. Flowers axillary, solitary, deflexed. Calyx woody.—Native of bushes of rocks, in Spain, Barbary, and Crete. A small, decumbent, branching flum, whose leaves are not half an inch long; green above; white beneath. Flowers pink, their calyx bent down, so as to make a right angle with its footstalk, and then recurved. Segments of the upper lip of the corolla advanced towards the base of the lower in a remarkable degree. Style reflexed.

T. laxmannii. Laxmann's Germander. Linn. Syll. Veg. ed. 13. 439. Willd. n. 16. Ait. n. 10. March. von Bieberr. Taur. v. 2. 35. " Waldtt. und Kitaib. Hung. v. 1. 71. t. 69."—Leaves elliptico-oblong, villous, ribbed, nearly entire. Flowers axillary, solitary, opposite, turned one way.—Native of Siberia, Hungary, &c. We notice this species here merely to express our concurrence with the opinion of the able author of the Flora Taurico-Caucasica above cited, that it certainly belongs to Ajuga, as well as the T. sylvestristum, Linn. Mant. 80, already referred thither by Schreber and Willdenow. The two species are very nearly akin, and answer in character and habit entirely to Ajuga, and not to Teurcium.

T. Ardani.
TEUCRIUM.

T. Arduini. Arduini's Germander. Linn. Mant. 81. Willd. n. 20. Sm. Pl. Grec. Sibth. t. 531, unpublished. (T. foliis ovo-crescutis, subhirsutis, petiolatis, caulibus spicis flavescentibus floribus terminatis; Arduini. Spec. t. 12. t. 3. Scutellaria cretica; Linn. Sp. 836. Willd. Sp. Pl. v. 3. 176. Ait. Hort. Kew. v. 3. 429. Callidae cretica fruticosa, catariz folio, flore albo; Tourn. Cor. 11.)—Leaves ovate, ferrated, hairy. Clusters densely imbricate, cylindrical, with linear bracteas, longer than the flowers. Upper segment of the calyx dilated, heart-shaped; two lower petalaceous.—Native of Crete, and of the shady woods of the Bithynian Olympus. It appears to have been cultivated by Miller in 1729. Although Linnaeus, in referring this plant, after "Tournefort, to Scutellaria," perceived it to be a Teucrium, neither he nor any one else, till lately, suspected it to be described twice over in his works. This we discovered by a comparison of original specimens. The stem is herbaceous, not shrubby, square, cross-branched, leafy, rough with spreading hairs. Leaves ferrate, not unlike those of Balm in size, form, and colour. Clusters from one to four inches long, near an inch in diameter, solitary at the ends of the branches, erect, of innumerable crowded white flowers. The calyx is hairy, suddenly bent downwards at its taper base, then horizontal, its border very unequally five-cleft; the upper segment broad, as in Scutellaria, reflexed at the sides, tipped with a britle; two next short, triangular; two lowest long, narrow, with pungent points.

T. canadense. Nettle-leaved Hoary Germander. Linn. Sp. Pl. 789. Willd. n. 21. Ait. n. 13. Pursh n. 1. (Chamedrys canadenensis, urticae folio, subtus incan; Tourn. Fl. N. A. 225.)—Leaves ovato-lanceolate, ferrated, sharply ferrated, downward on both sides; hoary beneath. Cluster terminal, dense, somewhat whorled. Bractea ovate, shorter than the flowers. Segments of the calyx nearly equal.—In low grounds, on the borders of ponds and lakes, from Can-ada to New York, perennial, flowering in July and Au-gust. The habit of the leves and inflorescence is like that of some spiked Veronica. At the inception of each pair of flower-flats, the stem is surrounded with a ring of prominent hairs. The calyx is bell-shaped, with five broad, nearly equal, segments. Corolla purple.


Parf.—Miller is said to have cultivated both these North American species in 1798. We have seen only the former.

T. abutiloides. Mulberry-leaved Germander. L'Herit. Stirp. v. 1. 184. Willd. n. 27. Ait. n. 17. Jacq. Hort. Schor. v. 3. 58. t. 358.—Leaves heart-shaped, acute, crinate, downward. Clusters axillary, not longer than the flower-flats.—Discovered by Mr. Maffon in Madeira, from whence it was brought to Kew, in 1777. It flowers in the green-house in April and May, and is conspicuous for the large size of its leaves, four or five inches long, on densely downward flower-flats, half that length. The flowers are no less remarkable for their golden hue, and their situation in dense, foliary, lateral, ferrated claters, which rarely equal the flower-flats in length.

T. Scordonia. Wood Germander, or Wood Sage. Linn. Sp. Pl. 789. Willd. n. 28. Fl. Brit. n. 1. Engl. Bot. t. 1543. Curt. Lond. f. e. t. 1. 40. Fl. Dan. t. 485. (Scordonia; Rivin. Monop. Irr. t. 12. S. five Salvia agrestis; Ger. Em. 662.)—Leaves heart-shaped, ferrated, ferrated, hairy. Stem erect. Flowers leaning to one side, in lateral and terminal clusters.—Very common in dry heathy ground, and sandy woods, throughout Europe, from Nor-way to Greece, flowering in July and August. Linnaeus seems to have recollected this plant with delight in the fields of Hartbeck, where the garden of his friend Clifford had been to him a real paradise. The root is creeping and perennial. Herb a foot or two in height, dark green, hairy, bitter, with a strong scent like hops, for which it is said to be not a bad substitute in brewing. We with nothing worse had ever been used. The long aggregate clusters of flowers are rendered conspicuous by the contrast of the pale yellow corolla and purple flammes. The upper segment of the calyx approaches in form and breadth to what we have pointed out as so remarkable in T. Arduini.

T. betonicum. Hoary Germander. Ait. ed. 1. v. 2. 279. ed. 2. n. 19. Willd. n. 30. L'Herit. Stirp. v. 1. 83. t. 48. Curt. Mag. t. 1114. (T. betonicefolium; Jacq. Coll. v. 1. 145. t. 17. f. 2.)—Leaves ovato-lanceolate, bluntly ferrated, flat and downy; hoary beneath. Stem ferrubby. Clusters aggregate, terminal. Bracteas lanceolate, cut; Native of Madeira. A very handsome greenhouse shrub, introduced by Sir Joseph Banks, in 1775, flowering most part of the summer, and easily propagated by cuttings. The crimson flowers are elegantly contrasted with the hoariness of the herbage; the upper surface of the leaves being greener than the rest. The segments of the upper lip of the corolla being broader and blunter than usual, some doubts have been entertained whether this species belonged to Teucrium or to Aegia, or whether these genera were really distinct. To this we would answer, that the habit of the latter is peculiar, and its essential character no less clear, consisting in a short notched upper lip, instead of the remotely-lobed one of Teucrium. We believe moreover that the central lobe of the lower lip is always divided and divedicarated in Aegia.

T. mossiifolium. Apple-scented Germander. Linn. Sp. Pl. 789. Willd. n. 32. Ait. n. 21. Jacq. Hort. Vind. v. 1. 41. t. 94. (T. n. 6; Gerard. Galop. 277. t. 11.)—Leaves ovate, rugged, hoary, strongly crenate. Stem erect. Flowers turned to one side, in lateral and terminal, upright clusters.—Native of the isles of Hyeres, but scarcely known in any other country, nor is it often to be seen in gardens. The stems are a foot high. Leaves ferrated, blunted, hardly an inch long. Flowers small, light crimson. Upper segment of the calyx broad-ovate. The whole herb is clothed with a hoary, soft, velvet-like pubescence, and when touched exhalcs a very powerful and peculiar scent, like mellow apples, and therefore, to many people, not agreeable, though combined with a spicy fragrance. Gerard's plate, like the others in his book, is very finely executed.

TEUCRIUM.

the leaves. This herb has formerly been celebrated for its deobstruant and tonic qualities, but is now out of medical use, except perhaps in the cresses of the country.

T. jordanioides of Schreber. Willd. n. 35, seems to us, without doubt, a variety of the last, as it is made in Prodr. Fl. Grac. v. 1. 393.

T. Chamaedrys. Wall Germander. Linn. Sp. Pl. 790. Willd. n. 36. Fl. Brit. n. 3. Eng. Bot. t. 680. Woodv. Suppl. t. 243. (Chamaedrys; Rivin. Monop. Irr. t. 10. f. 2. Tourn. Infl. t. 97; a much better figure. C. major latifolia; Ger. Em. 656.)—Leaves nearly ovate, stalked, deeply crenate. Flowers axillary, three together, stalked. Stem round, hairy. Found on dry rocks and old walls in the more temperate or warm countries of Europe. It is abundant on the old city wall, on the north side of Norwich, as well as here and there in other parts of England, but not universally. Dr. Sibthorp observed the plant in dry flinty places, throughout Greece and the Isles of the Archipelago, where it still retains nearly the same appellation of Chamaedrys, recorded in Dioscorides. It flowers in July and August, and has a perennial creeping root. The stem is bushy, rather diffuse, and slightly shrubby, a span high. Leaves of a full shining green, slightly hairy; deeply crenate and cut. Flowers cymifom, numerous, more handsome than those of T. Scordium, with which species the present has been supposed nearly to agree in virtues. It is equally bitter, but more agreeably, though less powerfully, scented.

T. lucidum. Shining Germander. Linn. Sp. Pl. 790. Willd. n. 39. Ait. n. 25. Sm. Fl. Grac. Sibth. t. 532, unpubl. (Chamaedrys alpina fruticosa, folio splendente; Tourn. Infl. 205. Magnol. Hort. 52. t. 9.)—Leaves ovate, stalked, deeply crenate, smooth and shining. Flowers axillary, three together, stalked. Stem square, erect, nearly smooth. —Native of alpine valleys in Savoy and Provence. Found by Dr. Sibthorp on Parnassus, and other Grecian mountains, as well as in the island of Cyprus. The tall, erect, square stems, often quite smooth; numerous whorls of large cymis flowers; and shining leaves, of which the upper or floral ones are more numerous quite entire; all render this plant, at first sight, decidedly different from the last, and yet they are very nearly related, so that an essential difference is difficult to seize, and perhaps none that has yet been indicated is invariably constant.

T. flavum. Yellow Shrubby Germander. Linn. Sp. Pl. 791. Willd. n. 41. Ait. n. 26. Sm. Fl. Grac. Sibth. t. 533, unpubl. (Teucrum; Rivin. Monop. Irr. t. 19. f. 1. Chamaedrys fruticosa major, floribus ochroleucis; Morif. fept. 11. t. 22. f. 1.)—Leaves ovate, crenate, downy. Whorls five flowered, composing terminal clumps, with ovate, concave, entire bracteae. Stem shrubby, downy. —Native of rocks and old walls, in the south of Europe, and north of Africa; abundant in the Archipelago, and on the walls of Rome. The stem is woody, branched, erect, about two feet high: its branches leafy, blunter quadrangular, clothed with very soft, velvet-like, curved pubescence, as is the whole of the herbage. Leaves stalked, hardly an inch long; tapering and entire at the base. Flowers pale yellow, composing long, whorled, erect cymes, with palegreen bracteae, about equal to the calyx. The teeth of the latter are nearly equal. Upper segments of the corolla edged with red.

T. bicolor. Two-coloured Chili Germander. (T. heterophyllum; Cavan. It. v. 6. 566. t. 577.)—Leaves wedge-shaped, obtuse; undivided or cut. Flowers axillary, solitary. Calyx nearly regular, with ten strong ribs. —Gathered by Louis Nee, in the neighbourhood of Talcachano, in Chili, flowering in November and December. We have a wild specimen from the late abbé Cavanilles, whose specific name we are obliged to change, there being already a T. heterophyllum, Willd. n. 37. The stem is shrubby, almost six feet high, with square leafy branches, clothed, like the calyx, flalked, and under side of the foliage, with very short dense pubescence. The leaves are about an inch long, nearly smooth on the upper side, various in breadth; the broadest deeply and coarsely cut; the rest undivided and entire; the lower ones on short stalks; the upper sessile. Flowers from the bosomes of the upper leaves, on shortish, round, finely downy stalks. Calyx cut almost half way down into five, nearly equal, acute, ovato-lanceolate segments, each with a strong mid-rib; its tube having five intermediate ribs besides. Corolla externally hairy, white, the middle of its lower lip of a violet red.


Corvmbas terminal. Leaves linear-lanceolate, somewhat revolute, almost entire; cottony beneath. Calyx reticulated, ten-ribbed, slightly downy, with spinous teeth. —Native of dry mountainous or alpine situations, in Germany, Switzerland, France, Spain, and Greece; sometimes, though rarely, preserved in pots, under a frame, in our more curious gardens. A dwarf bushy shrub, like Thyme, with a strong woody root, and many diffuse, downy, leafy stems. Leaves crowded, opposite, stalked, hardly an inch long, very rarely notched, various in breadth; green, convex, and nearly smooth, above; veiny, very white and cottony beneath. Flowers in dense, sessile, solitary corvmbas. Calyx tubular, pale, with equal spreading, tapering, pungent teeth, from whose intermediate sinuæ the veins spread star-wise. Corolla pale buff-coloured, the segments of its upper lip veined with red.

Schreber has long ago united T. montanum and fupinum; nor was Linnaeus ignorant of their near affinity; though in this instance, as in every thing relative to alpine plants of the south of Europe, which he had rarely examined alive, he was disposed to give up his own opinion, to that of practical observers. Clusius having represented T. fupinum to different in size and habit from montanum, might help to mislead following botanists; but in truth they hardly deserve to be distinguished as varieties, fupinum being only rather less luxuriant, with narrower leaves, which indeed vary on the very same root. The species before us has lent a specific name to some other plants, as Andromeda polifolia of Linnaeus, and Menziesia polifolia of Jussieu, which have no so frequent to the true ancient Polium hereafter described, but greatly ressemble this.

T. pyrenaeum. Pyrenean Germander. Linn. Sp. Pl. 791. Willd. n. 45. Ait. n. 29.—Corvmbas terminal. Leaves orbicular, crenate, hairy; entire and slightly wedge-shaped at the base. Calyx-teeth tapering, fringed. —Native of the Pyrenees. Cultivated by Miller in 1731, at Chelsea garden, where we have seen it a few years since, yet there seems to be no certain figure of this beautiful plant extant. Its habitat is somewhat like the last, but the leaves totally different, being almoft orbicular, and from half an inch to an inch in diameter, flat, green, veiny and hairy. Flowers in dense convex tufts, variegated with pale yellow and purple; the ribs and teeth of the calyx fringed with long brilily hairs. Whether
Whether Schreber's *T. rotundifolium*, Wild. n. 46, to which the figures of Boccone and Barrelier, cited for the former, are said to belong, bo more than a variety, we have no means of determining.


*Polium montanum* : Ger. *Em.* 653, 554. P. montanum album ferratum, &c. ; *Barcl. Ic.* t. 1024.—*Heads roundish, leafy. Leaves febrile, oblong, obtuse, convex, bluntly crenate, densely woolly. Calyx very woolly, obtuse, pointless.—Native of mountains in Italy, Spain, and the north of France; common in Greece, the Archipelago, and throughout the Levant; rarely seen in our gardens, being impatient of wet. *The root is woolly and very strong. Stems numerous, a span long, ascending, erect, or partly decumbent, round, clothed, like the ruff of the herbage, with extremely soft, white, woolly down. Leaves numerous, opposite, half an inch or an inch long, thick and woolly, their edges remarkably deflexed, with strong, round, recurved teeth; the base slightly wedged-shaped, scarcely flaked. Flowers numerous, in dense, sessile, terminal, often aggregate, heads, or short spikes, intermixed with leaves; the lower heads usually flaked. Calyx very woolly and obtuse. *Corolla* white, with a yellow palate.*

Schreber, who is followed by Willdenow, makes numerous species out of the reputed varieties of this plant, of which we are unable, for want of sufficient means of examination, to form an opinion. The characters given do not satisfy us, nor do the specimens we have seen afford better.

The most striking of the whole is *T. aureum*, Schreb. Unlab. 43. Wild. n. 48. *Ait. n. 35.* Cavan. Ic. v. 2, 16. t. 17, remarkable for the golden tint on its heads and upper leaves. This has usually a solitary head or spike, and perhaps the *calyx-teeth* are more slender and acute than in the common *T. Polium*, which merits inquiry. On the other hand, *T. capitatum*, which we shall next describe, approaches nearly to some of the above-mentioned varieties, so that perhaps they ought to be referred to it, rather than to *Polium*.

**T. capitatum.** Purple Poley Germander. *Linn. Sp. Pl.* 792. Wild. n. 56. *Ait. n. 32.* Cavan. Ic. v. 2, 17. t. 119. Sm. Fl. Græc. Sibth. t. 536, unpublished. (Polium montifolium ; Bah. *Hill.* v. 3, 299.)—*Heads roundish, leafy, lateral and terminal, flaked. Stems croft-branched. Leaves febrile, oblong-oblong, obtuse, convex, crenate, hoary. Calyx woolly, oblong-oblong, pointless.—Native of hills in Siberia, Spain, the south of France, Zante, Cyprus, and Greece. This is of a more slender habit than the last, less woolly, and more hoary, with purple flowers, a more elongated tubular *calyx*, and narrower leaves. The tube of the *corolla* also is longer, and much less bell-shaped, or inflated in the throat. It is nearly related to *T. Polium*, but is a distinctly different species.

**T. canescens.** Wedge-leaved Poley Germander. *Sm. Prodr. Fl. Græc. Sibth.* n. 1311. Fl. Græc. t. 537, unpublished.—*Heads terminal, dense. Leaves rounded, densely crenate; wedge-shaped at the base; woolly all over. Calyx blunt, pointless.—Gathered by Dr. Sibthorp, on the Sphæciote mountains of Crete. The general outline of the plant answers to *T. rotundifolium*, Wild. n. 46; but that is a far less woolly plant, with a pointed *calyx*, and not allied to the *Polium* tribe. The present has round, trailing, shrubby, croft-branched *flora*, a foot or more in length. Every part of the herbage is covered with thick, white, soft, woolly or velvety down. Leaves, with their stalks, an inch long. Flowers snow-white, in aggregate terminal heads. Calyx tubular, with short rounded teeth. Segments of the upper lip of the *corolla* large, as long as the *flora*, which they embrace, and partly conceal. Anthel red.

**T. alpestre.** Sharp-touched Alpine Poley Germander. *Sm. Prodr. Fl. Græc. Sibth.* n. 1312. Fl. Græc. t. 538, unpublished.—*Flowers axillary, solitary. Leaves wedge-shaped, rounded, deeply crenate, downy. Stem tufted, much branched.—Found by Dr. Sibthorp, upon the most lofty summits of the Sphæciote mountains of Crete. The *root* is woody, dividing at the crown into innumerable strong, woody, depressed *flora*, which bear a dense tuft of ascending, leafy, downy branches, hardly a finger's length. Leaves flaked, greyish, about half an inch long, obtuse. Flowers opposite, on short stalks, from the bosoms of two or three of the uppermost pair of leaves. *Corolla* tubular, finely downy. Tube, throat, and upper lip of the *corolla*, pale yellow; lower lip white, its middle segment deeply concave.

**T. pumilum.** Rosy-leaved Poley Germander. *Linn. Sp. Pl.* 792. Wild. n. 61. (Polium montanum pumilum rubrum ; *Barcl. Ic.* t. 1092, 1093.)—*Heads terminal, solitary, sessile, leafy. Leaves crowded, sessile, linear, revolute, smooth; downy beneath. Stems ascending, woolly. *Calyx* pointed.—*Native of hills in Spain, flowering in July and August.—From the woody perennial *root*, springing several, or more or less erect, simple or branched, leafy *flora*, three or four inches long, clothed with dense, soft, white wool. The *leaves* are hardly an inch long, crowded and somewhat imbricated, in four rows, narrow, strongly revolute, obtuse; convex, green and polished on the upper side; concave, with a downy rib, just visible beneath. *Calyx* ribbed, downy, with short, thick, spinous points. Tube of the *corolla* flesher, downy, as well as the outside of the limb.*

We are quite unable to imagine how *T. Liberati of Schreber, Wild. n. 62. Cavan. Ic. v. 2, 17. t. 118, came to be distinguished from *pumilum*, as there does not appear to be the least difference between them, except the *flora* of *Liberati* being more erect; but that circumstance is evidently variable. *T. verticillatum*, Cavan. t. 198. Wild. n. 59, seems also but a variety; though we presume not to determine this without seeing a specimen.

**T. pungens.** Thorny Germander. *Linn. Sp. Pl.* 793. Wild. n. 64. *Ait. n. 33.* Sm. Fl. Græc. Sibth. t. 539, unpublished. (Chamaedrys *pungens* ; Bah. *Hill.* v. 4, 17.) Scordium *pungens* odoratum ; *Corn. Canad. Ic.* t. 142. *Barcl. Ic.* t. 202. *S. pungens* ; Cavan. Ic. v. 19. t. 133.—*Stems and branches spinous, hairy. Flowers axillary, opposite. Upper segment of the *calyx* ovate; the reft awl-shaped, spinous.—Native of fields and hilly places in Spain and Portugal. Dr. Sibthorp met with it in fields between Smyrna and Burfa. The *root* is annual. Stems branched copiously from the very bottom, about a foot high, bushy, the branches opposite, crossing each other in pairs, spreading, square, clothed with very soft prominent hairs, tipped with strong spines, and furnished with smaller lateral ones, particularly at the insertion of the leaves and flowers. Leaves sessile, deflexed, small, oblong, obtuse, notched, green, hairy. *Flowers* numerous, solitary or in pairs, from the bosoms of the diminished or upper leaves, each on a short, round, hairy stalk. *Calyx* deflexed and bent at the base, then horizontal and somewhat bell-shaped; its upper segment very broad, ribbed, spinous-pointed, erect, or rather reflexed, the four others shorter, prominent, ascending, pungent. *Corolla* white, with red stripes on its upper lip; the middle segment of the lower very large, slightly concave; the base of the tube globular.—The flowers are by no means reverber, *refusinales*, in Sibthorp's figure of this species, though Latting
of the species following are the most generally cultivated: the yellow-flowered shrubby germander (T. flavum), the fage-leaved germander, or wood-fage (T. scordonia); the nettle-leaved germander (T. canadensis); the dwarf mountain germander (T. montanum); the Pyrenean germander (T. pyrenaicum); the poley (T. polum); the round-headed germander (T. capitatum); the dwarf germander (T. pumilum); the narrow-leaved tree-germander (T. fruticans); the broad-leaved tree-germander (T. latifolium); the Cretan germander (T. creticum); and the common marum or cat-thyme (T. marum).

There is a variety in the first fort which is hairy, with yellow flowers, with pale white flowers, and with purple flowers. In the fourth fort there is likewise a variety with much smaller leaves, which are hoary on their under side.

Allo in the fifth fort there are several varieties; as the common yellow poley, which has the stalks rather herbaceous and trailing, about six inches long, and hoary: leaves woolly, about half an inch long, fome wedge-shaped, others oblong, ending in obtuse points, and crenate towards their ends: the flowers collected in oblong thick spikes at the end of the branches, of a deep yellow colour, and appearing at the beginning of June. This grows naturally in Spain. The narrow-leaved yellow poley, which has woody stalks, erect, branching, and covered with a hoary down, rising six or eight inches high; the leaves linear, woolly, about half an inch long, having sometimes two or three flight indentures on their edges; the flowers collected in roundish spikes at the end of the branches; they are bright yellow, have woolly calyces, and appear in June and July. It grows naturally in Spain and Portugal. The white poley, which has the stems a foot long, and trailing: the leaves are a little cottony, entire on the sides, but toothed at the end: the flowers are pretty large, white, tinged a little with purple. It is a native of the south of France. There is also the purple poley.

And there is a variety in the seventh fort which has an erect branching stalk, that rife a foot high; the lower part becomes woody, but the upper is herbaceous: the leaves are linear-lanceolate, about an inch long, crenate, of a pretty thick consistence, and a little woolly: the flowers collected in a corymbs at the end of the branches, white, appearing in July and August. The ninth contains a variety which is a little more branched, and has smaller shorter leaves: the flowers are paler, the flamin somewhat longer, the authors smaller and brown; whereas in the larger fort they are violet: and another with variegated leaves.

Method of Culture.—All the herbaceous and ligneous kinds may be readily increased by parting the roots, by slips of the young branches, and seeds: the roots may be divided in the autumn, or early spring, and the slips of the branches be taken off in the spring and summer, being planted out in moist shady situations, and well rooted, they may be removed to where they are to remain, though it is best to plant them at once where they are to grow: the seeds may be sown in a bed or border of common earth in the early spring season. But in the poehem kinds, the seeds should be sown in a bed of light earth, and the plants be either put out in nursery-
species of instrument, but the time and place where it was first constructed. There is little science, and still less ingenuity, in the examples of composition given in illustration of the rules of counterpoint: so that if the young student, who perfumes this work for instruction, is not a conjurer before he begins the task, he will not be made one by the mysteries which it unfolds.

Yet with patient perseverance, a young student who has little leisure, and few books to read, may become superficially learned with little trouble by this book. Tevo quotes authority for all that he advances; but his authorities are not always good, nor does he distinguish good from bad. Several obscure and even contemptible authors are quoted in the same fulsome manner as the best. But in citing so many writers indifferently, the chief part are now so scarce and difficult to be found, that in search of them all the great libraries of Europe may be visited in vain. To save the student's time, and form his taste in literature, as well as judgment in music, the author should have quoted none but writers of the first authority, or have told his young readers what theirs was to be laid on the rest.

But since the time of Tevo, so many better authorities in composition and didactic works, both on the theory and practice of music, have appeared, that we can hardly recommend the "Musico Telfore" to the perusal of any but those who have much time to spare, who read every thing, and are curious to know the history and state of the art at every period of time.

TEUOGHIS, in Ancient Geography, a lake and town of Egypt.

TEVEN-SOUSAN, in Geography, a town of Chinche Tartary ; 12 miles N.W. of Teldom.

TEUPITZ, a town of Brandenburg, in the province of Mark, on a lake ; 20 miles S. of Berlin. N. lat. 52° 5'. E. long. 16° 30'.

TEURERT, or TEVRERT, a town of Fez, on the borders of Algiers ; 40 miles E.N.E. of Teza. N. lat. 34° 2'. W. long. 3° 30'.

TEURSCI, in Ancient Geography, a people placed by Ptolemy in the northern part of Dacia, between the Anerti and the Cifoboci.

TEURISTAE, a people of Germany, placed by Strabo in the vicinity of the Danube and the Alps.


TEURTEVILLE, in Geography, a town of France, in the department of the Channel ; 6 miles N. of Valognes.

TEUSCHNITZ, a town of Bavaria, in the diocese of Bamberg ; 34 miles N.E. of Bamberg. N. lat. 50° 23'. E. long. 11° 30'.

TEUSHANUSHSOUTHSGOGLATA, an Indian town of Pennsylvania, on the Allegheny river.

TEUTATES, in Mythology, a name or attribute of the Supreme Being, which was worshipped by the Gauls and Britons as a particular divinity. It is evidently compounded of the two British words "Deu-tatt," which signify God the parent or creator, a name properly due only to the one true God, who was originally intended by that name. Thus Lucan, i. 1. v. 445: "Et quibus immaculis placetur sanguine divo Teutates; horranque feris altaebarus Hefus."

When these ancient nations sunk into idolatry, they degraded Teutates into the sovereign of the infernal world, the name with the Dios and Pluton of the Greeks and Romans (or, as others think, with Mercury); and worshipped him in such a manner as could be agreeable to none but an infernal power.

TEUTHEA, in Ancient Geography, a considerable town of the Peloponnesus, in Achaia, W. of Tritus.

TEUTHIS, a town of the Peloponnesus, in Arcadia, in which were a temple of Venus, and another of Diana.

TEUTIS, in the Linnean system of Ichthyology, a genus of the abdominal fishes; the characters of which are, that the head is a little truncated on the fore-part; that the branchiostegal membrane has five rays; and that the teeth are equal, rigid, and near each other, and forming a regular chain. Linnaeus and Gmelin mention two species; viz. heaptus, and juers or jawa. This genus is now annulled, and the species are transferred to Acanthus and Chedodon.

HEPATUS; Acanthus Teuthis; Blue Acanthus. With the middle of the body paler, and a spine on each side of the tail. This is a native of the Indian and American seas, ten or twelve inches long, or more; resembling in shape the chedodons, the head sloping in front from the origin of the dorsal fin; the colour, when recent, a deep or blackish-blue; on each side of the body is a very large, oblong-ovate whitish patch or spot, surrounded by a border of a deeper colour; the skin is heightened by very small scales; the tail is slightly lunate, darkly on the upper and lower part, and marked towards the base by a whitish ovate spot; the teeth are cemented; and on each side of the base of the tail is a very strong spine, capable of elevation at the animal's pleasure, to an horizontal direction, from the channel in which it lies. The fish figured by Catesby in his Natural History of Carolina, under the name of Teg, is supposed to be this species.

JAVA or JAVUS; Chedodon Guttatus. Whitish-grey, with oblong body, sprinkled with very numerous, round, rufous spots; length about ten or twelve inches; colour grey, with a dully tinge on the upper parts, and every where sprinkled, except on the head, pectoral, ventral, dorsal and anal fins, with numerous, small, round, rufous spots; scales small, none at the bases of the fins; gill-covers smooth; dorsal and anal fin of moderate breadth; tail slightly inclining to a forked, or rather lunate shape, and speckled like the body. Native of Java. This species is supposed by Bloch and Cepedea to be the teuthis javus of Linnaeus. But Dr. Shaw remarks, that Linnaeus's description does not agree in the disposition of its colours with those of the C. guttatus, as it is expressly said to be marked with longitudinal streaks; so it is figured by Gronovius. See Chedodon Guttatus, changing Japan in the close of that article to Java.

TEUTHOPACE, a word used by the ancients to express a sort of food made of beet-roots and lentils, often preferred as a good diet for the sick.

TEUTHRANIA, in Ancient Geography, a town and small country of Mylia, situated towards the E., and near the source of the Cicus. Herodotus says that it was once a gulf, and it was gradually formed by the accumulation occasioned by the Cicus.

TEUTHRANA, a town of Laconia, in a small bay, on the Laconic gulf, N. E. of Pyrrhus.

TEUTLAN, in Geography, a town of Mexico, in the province of Guadalajara; 55 miles N.N.W. of Guadalajara.

TEUTLEBEN, a town of Germany, in the principality of Gotha; 4 miles W. of Gotha.

TEUTON, in Ancient Geography, a people of Germany, who at the time when the Romans became acquainted with them, were politically connected with the Cimbri, if they
they were not actually a tribe of the same people; and settled at no great distance from them. (See Cimbr.) They are said to have worshipped a divinity called Thaut, who is supposed to have been one of their ancestors debased. The Teutones were known before the Cimbri, and uniting with them, overrun the territories that were subject to the Romans; and it has been affirmed that they inhabited the banks of the Codani Sinus, and the island called Codania Infida, whence they assumed the appellation of "Codani," Pytheas of Marseille, according to Pliny, is the first author who mentions the Teutones; and Pomponius Mela says, that their habitations were near the gulf Codanus. It is very probable that they extended themselves through the country that bordered on the Baltic sea; and that from thence they engaged in many warlike emigrations; transporting themselves with their arms and baggage, their wives and children, through other countries which they pillaged. It was in the year 690 that they first became known to the Romans; having advanced south of the Danube to the country called Noricum, where they were encountered by the confidant C. Papirius Cursor, who obstructed their passage towards the borders of Italy. They then proceeded towards Gaul, and made their inroads among the Helvetian. Having arrived in Gallia Narbonensis, the Cimbri were there defeated by the confidant Aurelius; but the Teutones made an attempt to invade Italy by the Western Alps. They were, however, refuted by Marius, and in a desperate engagement, in which the latter proved victorious, the Teutones left upon the field an almost incredible number of slain; which included the Gauls who had fallen in a combat which took place some days before, amounted, according to historians, that have not been chargeable with exaggeration, to 100,000 persons. Marius also defeated the Cimbri in Italy.

TEUTONIC, something belonging to the Teutones, an ancient people of Germany, inhabiting chiefly along the coast of the German ocean. See Gothic.

TEUTONIC Language, the ancient language of Germany, which is ranked among the mother-tongues.

The Teutonic language, now called the German, or Dutch, and is distinguished into upper and lower.

The upper has two notable dialects; viz. 1. The Scandian, Danish, or perhaps Gothic; to which belong the languages spoken in Denmark, Norway, Sweden, and Iceland.

2. The Saxon, to which belong the several languages of the English, Scots, Frisian, and those on the north of the Elbe.

To the lower belong the Low Dutch, Flemih, &c. spoken through the Netherlands, &c.

The learned Mr. Whitaker has lately, in his History of Mancheoter, controverted the opinion of those who affirm the English language to be genuine and unmixed Teutonic, and asserted it to be of Celtic origin. Mr. Drake, in his Essay on the Origin of the English Language, Archael. vol. 5. has endeavoured to support the former opinion, by comparing part of Ulphil's Gothic version of the gospel of St. John, executed above 1400 years ago, with the same in our present translation, and evincing the striking affinity between the two languages; notwithstanding the different mediums through which they have been deflected, and the many ages that have elapsed since they have been separated. Every circumstance, he observes, that constitutes the true genius of a language, is visibly derived to the English from the Goths and Saxons. The articles, flexure of the genitive case, prepositions and auxiliary verbs, are all absolutely Teutonic. The English, he says, is clearly the natural descendent of the Gothic or Teutonic; and he challenges the deepest enquirer into the Celtic to produce so decisive a proof of any affinity of that tongue with ours. The British, he adds, has little or no resemblance to the English. Many of their terms may have gained admittance among us, as, from the vicissitude and long intercourse we have had with that people, may necessarily be imagined, but their idioms and genius are so radically and essentially different as any two languages can possibly be.

TEUTONIC Order, a military religious order of knights, established towards the close of the twelfth century; and thus called, because it confided principally of Germans, or Teutones.

The origin, &c. of this order were thus: the Christians, under Guy of Lusignan, laying siege to Acre, or Acon, a city of Syria, on the borders of the Holy Land; at which siege were present, Richard king of England, Philip Augustus of France, &c. some Germans of the names of Halberstadt, Fulda, and Lubeck, touched with compasion for the sick and wounded of the army, who, when they observed the want of military attendances, and the difficulty of purchasing the same themselves, purchased them for the soldiers at so reasonable a price; and not only made it a point of honour with them to be колов in their charge, but also to defend them in their charge, but also to defend them at the peril of their lives. They procured, on this occasion, the sanction of the Emperor Henry IV., who, by a Bull, gave them the title of Teutonic Knights, or of St. John. They were afterwards established at Acre, and enjoyed all the rights of a religious order, and the advantage of the privileges of a military order.

The first act of the Teutonic order, in the beginning of the twelfth century, was to acquire the isles of Zante and Malta, with which they had hitherto been merely concerned. They now formed a strong base of operations from which they began to extend their dominion over the heathen states of the Levant, and rendered themselves the objects of the envy and hatred of the fleets of the Venetians, the Genoese, and the Egyptians. Their first object was to establish a religious station at Acre, which they did with the consent of the Pope, and the assistance of the Emperor Henry IV. The latter now granted them the title of Teutonic Knights, and the right of acquiring all the territory between Acre and Egypt, for the purposes of the order. They were also permitted to build a church at Acre, and to hold a market in the same city. They were thus established as a military order, with the privilege of erecting a church in the city of Acre, and of holding a market in the same city. They were also permitted to build a church at Acre, and to hold a market in the same city. They were thus established as a military order, with the privilege of erecting a church in the city of Acre, and of holding a market in the same city. They were also permitted to build a church at Acre, and to hold a market in the same city. They were thus established as a military order, with the privilege of erecting a church in the city of Acre, and of holding a market in the same city. They were also permitted to build a church at Acre, and to hold a market in the same city. They were thus established as a military order, with the privilege of erecting a church in the city of Acre, and of holding a market in the same city. They were also permitted to build a church at Acre, and to hold a market in the same city. They were thus established as a military order, with the privilege of erecting a church in the city of Acre, and of holding a market in the same city. They were also permitted to build a church at Acre, and to hold a market in the same city. They were thus established as a military order, with the privilege of erecting a church in the city of Acre, and of holding a market in the same city. They were also permitted to build a church at Acre, and to hold a market in the same city. They were thus established as a military order, with the privilege of erecting a church in the city of Acre, and of holding a market in the same city.
TEU

TEUTSCH LEIPSH, in Geography, a town of Hungary 5 miles E. of Rofenberg.

TEUTSCH Pron, a town of Hungary; 10 miles N.W. of Kreminitz.

TEUTSCHDORF, a town of Hungary; 5 miles N.W. of Cachau.

TEUTSDORF, a town of Prussia, in the province of Oberland; 10 miles E.N.E. of Holland.

TEUVRENT, a town of Africa; 145 miles E.N.E. of Fcz.

TEUW, a small island in the East Indian sea. S. lat. 7° 17'. E. long. 129° 20'.

TEUXNota, in Ancient Geography, a town of Sicily, which had been built by Micythus, king of Rhegium and Zancle, according to Diodorus Siculus.

TEWANTAPAGUE, in Geography, a town of Mexico, in the province of Guaxaca; 135 miles E.S.E. of Guaxaca.

TEWKESBURY, anciently Teudechberie, a large and respectable borough and market-town, in the lower division of the hundred of the same name, in Gloucef

TEW, small island in the East Indian sea. S. lat. 7° 17'. E. long. 129° 20'.

TEUXNOTA, in Ancient Geography, a town of Sicily, which had been built by Micythus, king of Rhegium and Zancle, according to Diodorus Siculus.

TEWANTAPAGUE, in Geography, a town of Mexico, in the province of Guaxaca; 135 miles E.S.E. of Guaxaca.

TEWKESBURY, anciently Teudechberie, a large and respectable borough and market-town, in the lower division of the hundred of the same name, in Gloucef

TEW, small island in the East Indian sea. S. lat. 7° 17'. E. long. 129° 20'.

TEUXNOTA, in Ancient Geography, a town of Sicily, which had been built by Micythus, king of Rhegium and Zancle, according to Diodorus Siculus.

TEWANTAPAGUE, in Geography, a town of Mexico, in the province of Guaxaca; 135 miles E.S.E. of Guaxaca.

TEWKESBURY, anciently Teudechberie, a large and respectable borough and market-town, in the lower division of the hundred of the same name, in Gloucef

TEW, small island in the East Indian sea. S. lat. 7° 17'. E. long. 129° 20'.

TEUXNOTA, in Ancient Geography, a town of Sicily, which had been built by Micythus, king of Rhegium and Zancle, according to Diodorus Siculus.

TEWANTAPAGUE, in Geography, a town of Mexico, in the province of Guaxaca; 135 miles E.S.E. of Guaxaca.

TEWKESBURY, anciently Teudechberie, a large and respectable borough and market-town, in the lower division of the hundred of the same name, in Gloucef

TEW, small island in the East Indian sea. S. lat. 7° 17'. E. long. 129° 20'.

TEUXNOTA, in Ancient Geography, a town of Sicily, which had been built by Micythus, king of Rhegium and Zancle, according to Diodorus Siculus.

TEWANTAPAGUE, in Geography, a town of Mexico, in the province of Guaxaca; 135 miles E.S.E. of Guaxaca.

TEWKESBURY, anciently Teudechberie, a large and respectable borough and market-town, in the lower division of the hundred of the same name, in Gloucef

TEW, small island in the East Indian sea. S. lat. 7° 17'. E. long. 129° 20'.

TEUXNOTA, in Ancient Geography, a town of Sicily, which had been built by Micythus, king of Rhegium and Zancle, according to Diodorus Siculus.

TEWANTAPAGUE, in Geography, a town of Mexico, in the province of Guaxaca; 135 miles E.S.E. of Guaxaca.
holding the quarter-sectons; the upper floor for a banqueting room, and for the meeting of the corporation. Among the charitable establishments are a free grammar-school, a charity-school, and several alm-houses. The Anabaptists, Quakers, Independents, and Methodists, have each a meeting-house in the town. The population, according to the returns of the year 1811, amounted to 4820; the number of houses being 1003: the latter are chiefly of brick, and principally ranged in three spacious streets. Since the year 1786, when an act was passed for paving and lighting the town, many improvements have been made; and the buildings have assumed an air of respectability.

The Abbey.—A monastery was first erected here, and endowed by two brothers, Oddo and Doddo, dukes of Mercia; A.D. 715, to the honour of the Blessed Virgin, which having undergone many calamities during the civil and Danish wars, about 980 became a priory, subject to Cranbourn in Dorsetshire: but Robert Fitzhamon, a noble Norman, who came to England with the Conqueror, enlarged the buildings and increased the possessions of Tewkesbury so much, that the monks of Cranbourn chose, about 1102, to remove to this place, leaving only a prior and two monks behind, and made Cranbourn in future subject to the abbey of Tewkesbury. From this time it became a great establishment of Benedictine monks; and at the suppression, the annual revenues amounted to 1598l. 1s. 3d., exclusive of 1506. 8s. 1d. granted by the convent for fees and annuities: its plate also was very valuable, the facrity alone containing 1421 ounces. After the dissolution, the destruction of the monastic buildings was rapid and complete, through the ineffectual opposition of the monks to the visitations appointed by the king, who, in revenge, destroyed the Lady chapel, cloisters, chapter-house, and other appendages by fire. The remains of the buildings were afterwards purchased by the inhabitants: and the Abbey Church was made parochial. This magnificent structure displays an interesting example of early Norman architecture, combined with specimens of later styles, and in other respects well calculated to arrest the attention of the antiquary. It is built in the cathedral form, and consists of a nave, choir, transept, and central tower, with the addition of several chapels, ranged round the aisle of the choir. The nave and choir are separated from the aisles by eighteen massive columns, fulfilling the roof, and four substantial piers which support the tower. At the west end is a large window with a pointed arch, which appears to have been introduced within a femicircular arch in 1656. There were cloisters on the south side of the nave, where some fragments yet remain; and appear to have been highly ornamented in a similar style to those at Gloucester. The tower, according to the Abbey chronicles, was once terminated by a wooden spire, which fell down on Easter-day, 1559. The most remarkable specimens of the architecture are three tiers of arcades in the upper part; the arches of the middle tier have intervening mouldings. The length of the church is 300 feet; of the transept 120; the breadth of the choir and side-aisles is 70 feet; of the west front 100; the height from the area to the roof is 120 feet; the height of the tower 152 feet. The monuments, which are numerous, have attracted the attention of various antiquaries, particularly Mr. Cough and Mr. Lysons; the latter of whom has taken great pains in ascribing the different tombs to the real personages they were intended to commemorate: many mistakes, in this respect, having been committed on traditional authority by former writers. Near the west end of the church is the Abbey Gate-house, which appears of the age of the fifteenth century; it is embattled and ornamented with grotesque figures, projecting from a cornice; beneath which is a canopied niche between two square windows.—Dyde's History, &c. of Tewkesbury, v. 1756. Rudge's History of Gloucestershire, vol. i. 1803. Beauties of England and Wales, vol. v. Gloucestershire; by J. Britton and E. W. Brayley.

Tewkesbury, called Wanstefi, or Pawtecket, by the Indians, a township of Massachusetts, in the county of Middlesex, containing 943 inhabitants; 24 miles N. of Boston.

TEXALI, in Ancient Geography, the inhabitants of the sea-coasts of Aberdeen: who had a town, called Deva, at the mouth of the river Deva (Dene), where old Aberdeen now stands.

TEXAS, in Geography, a province of New Spain, which properly forms part of Louisiana. This province is claimed by Spain as part of the internal provinces, and included in the vast intendency of San Luis Potosí: it is bounded by the state of Louisiana, S. by the gulf of Mexico, W. by an imaginary limit, and N. by Red river, and contains an area exceeding 100,000 square miles. The capital of this province is the garrison of San Antonio de Bejar, ridiculously called the New Philippines. It was founded in 1731, confiding of a captain, a lieutenant, and one company of soldiers. The river of Cenis in this province, is now a most Indian village, with the ruins of a fort built by the French. That called Natchitoches, from an Indian tribe, friends of the French and enemies of the Spaniards, was a small fort, built on an island of the Red river by some French veterans.

TEXEIRA, JOSEPH (Peter), in Biography, a Portu- tuguese historian, was born in 1543, entered among the Dominicans, and became prior of the monastery at Santarem in 1578. When Philip II. of Spain took possession of Portugal, Texeira attached himself to Don Antonio, who had been proclaimed king by the Portuguese, and accompanied him into France. In 1582 he was taken prisoner by the Spaniards, but made his escape from Lisbon. He became confessor to Don Antonio, and, in process of time, preacher and almoner to the French king Henry III. He afterwards attached himself to Henry IV., and in 1596 affiliated at the abjuration of Calvinism by the princes of Condé. He was sent on one million to England, and favourably received by king James. He died at Paris in 1604, as some say; but according to another account, in 1620.

In 1582, Texeira printed his "Compendium de Portugalliae ortu Regni initiis, &c." This work was answered by order of the king of Spain; and Texeira replied, in 1592, by a "Confutatio, &c." which proceeded to refute the hereditary right of Philip to the crown of Portugal, and to vindicate that of Don Antonio;—probably the same work that is entitled "De Electronis Juris quod competit Viris Portugallienibus inaugurandi suis Regibus," Lyons, 1580.
As a genealogist, under which character he was distinguished, he published in 1590, "Exegetis Genealogicae Arboris Gentilitiae Henrici IV., Gallorum Regis," enlarged in 1598, with the addition of the princes of Condé's abjuration. In token of the indignation he felt at the seizure of his country by Philip, he affirmed, as it is said, in one of his sermons, that "we were bound to love all men, of whatever religion, sect or nation, even if they were Calvillians." Boyle. Morei.

TEXEL, or TESSEL, in Geography, an island of Holland, about 11 miles in length, and 5 miles in its greatest breadth; situated at the mouth of the Zuyder See, with a capacious and good harbour, and a fort, which commands the entrance; besides a town of the same name, it contains five villages: the land is fertile in pasture, and the whole well fenced with dikes of prodigious length and height. Near this island was the celebrated sea-fight, between the fleet of Holland, under admiral Martin Harpertz Tromp, and that of England, under admiral Blake, in the year 1653, in which Tromp was killed. In the year 1673 a battle was fought between the fleet of Holland and the united fleets of England and France, in which the victory was doubtful. N. lat. 53° 5'. E. long. 4° 40'.

TEXEUIT, or TEXIT, a town of Morocco; 100 miles W.N.W. of Morocco.

TEXT, a relative term, contradistinguished to gloss or commentary; and signifying an original discourse, exclusive of any note or interpretation.

Infinite pains have been taken by the critics, to restore, reconcile, fettle, explain, &c. the text of the bible, and that of the classics. See Bible.

Mr. Whitton accounts for all those misunderstandings between the Old and New Testament, particularly as to the prophecies in the Old, cited as fulfilled in the New, from the corruption of the text of the Old Testament; and to obviate objections made against Christianity on that head, has published an "Essay towards restoring the true Text of the Old Testament." See Prophecy.

This restoration he attempts to effect from the Samaritan Pentateuch, the Roman Pfalter, the Apostolical Constitutions, &c.

It sufficiently appears from the learned and acceptable labours of the late Dr. Kennicott, in collating the Hebrew manuscripts of the Old Testament, that the alterations introduced into the text, &c. are mostly of a trivial nature, and by no means affect the authority of the sacred writings.

Text is particularly used for a certain passage of scripture chosen by a preacher, to be the subject of his sermon.

A collection of texts appropriate to different subjects, and judiciously arranged, has been published by Dr. Enfield for the use of preachers in the composition of their discourses, and also of biblical readers and students.

Anciently, the lawyers began all their pleadings with like texts of scripture.

A text-book, in several universities, is a classic author written very wide, by the students, to give room for an interpretation dictated by the master or regent, to be inferred in the interlines.

In this sense, the French say, proverbially, Gloffe d'Orleans plus obscure que le texte.

The Spaniards gave the same text to a kind of little poem, or set of verses placed at the head of a glos, and making the subject of it; each verse being explained, one after another, in the course of the glosses.

Text, in Ancient Law Authors, is appropriated to the book of the Four Gospels, by way of eminence. These were written in gold letters, and carefully preferred in the churches.

"Codex aurato concepsus grammate scriptus.
Auctus evangelicum conlevrus corpore textum."

TEXTUARIES, TEXTUARI, a name given to the feot of the Caraites, among the Jews. Hillel shone among the traditionaries, and Schammai among the textuaries.

The civil and canon lawyers sometimes also call a book containing the bare text, without any gloss or commentary, a textuary, textuarium.

TEXTURE, TEXTURA, formed of texo, I weave, properly denotes the arrangement and cohesion of several slender bodies or threads interwoven or entangled among each other: as in the webs of spiders, or in cloths, stuffs, &c.

Texture is also used in speaking of any union or cohesion of the constituent particles of a concrete body; whether by weaving, hooking, knitting, tying, chaining, indenting, intruding, comprelling, attracting, or any other way.

In this sense, we lay a clofe, compact texture; a lax, porous texture; a regular or irregular texture, &c.

A great deal depends on the texture of the component parts of a body; hence most of its particular properties, its specific gravity, colour, &c.

TEXTUS Roffensis, is an ancient manuscript, containing the rights, customers, tenures, &c. of the church of Rochefort, granted by the laws of Ethelbert, Hothoer, Eadred, and Withred, kings of Kent, collected by Ernulf, the venerable bishop of Rochefort, about the year 1100.5.

TEYA, in Geography, a river of Austria, which rises about three miles N. from Germs, passes through a part of Moravia, and runs into the March, 11 miles N.E. of Zistersdorf.

TEYN, a town of Bohemia, in the circle of Boleflau; 12 miles W.N.W. of Jung Buntzel.

TE-YUEN, a town of Asia, in the kingdom of Corea; 93 miles N.E. of King-ki-tao.

TEZA, a town of Africa, in the kingdom of Fez, with a castle. It was once a populous city, but is now much decayed, yet is still the residence of a governor and a garrison; 20 leagues N.N.E. of Fez.

TEZCUCO, or Tetzucu, a lake of Spanish America, in the province of Mexico. The conjunct lakes of Tezcuco and Chalco are found to be about 30 English miles in length, and the former is about 15 miles in breadth; but as the latter is partly drained, so as to be at the distance of a league from the city, it is probably about twelve miles in breadth. This lake is celebrated in history, as originally containing the city of Mexico, and also as remarkable for the qualities of the water, partly fresh, and partly saline. The Chalco, or fresh-water lake in the south, appears to flow by a narrow channel into the salt lake of Tezcuco. See Mexico, substituting for Tezcuco, Tezaco.

TEZELA, a town of Africa, in the kingdom of Algiers; 5 leagues S.W. of Oran.

TEZERGBE, a town of Africa, in the kingdom of Fez; 100 miles E.S.E. of Teza.

TEZOUT, or TESSOT, a town of Africa, in the kingdom of Fez; 35 miles S. of Melilla.

TEFEN, a town of Egypt, on the Nile; 10 miles S.E. of Rosetta.

TFUOI, in the Chinese Manufactory of Persia, a word used to express a particular sort of varnish for that warp.
with violet-colour and gold. The usual method of doing this at first was by mixing gold with the common varnish, breaking the leaves very small, and then adding the common glue and the powder of calcined agate of a coarser kind, found in great plenty on the shores of their rivers. But they have since found that the brown varnish called tefkin succeeds much better, for when the blue is mixed with this, its brown colour is lost, and the gold lies on much better than it would any other way.

They had once a method of a varied varnish, which was very beautiful, but is much neglected now; this was the giving a vessel the brown varnish on the outside with a large portion of gold, and the common white varnish within. They also varied the degree of colour on the outside, by laying on more or less of the varnish; and gave this way a variety, even in the same colour. Obser, fur les Coutumes de l'Asie, p. 508.

TCID, in Geography, a town of Arabia, in the province of Oman; 48 miles N. of Tacht. THABBA, in Ancient Geography, a town of Arabia Felix, situated between Menambis and Seba, now Elba. Ptol.—Also, an ancient town of Africa, in the vicinity of Thila. THABET EBN KORRA, in Biography. See THEIRIT BEN CORAH.

THABILACA, in Ancient Geography, a town of Albania, between the rivers Gerrus and Soanes. Ptol. THABIR, in Geography, a mountain of Arabia; 20 miles S. of Medina. THABOR, in Ancient Geography. See TABOR.

THABORITES. See TABORITES.

THABRACA COLONIA, Tabarka, in Ancient Geography, a town and Roman colony of Africa, in Numidia, according to Ptolemy. It was situated on the western bank, and near the mouth of the river Taifa. Some wells remain of walls and cisterns.

THABUCUC, a town of Spain, in the interior of the Tarragonensis, belonging to the Vanduli. Ptol.

THACAS, Sasa, in Antiquity, a general name given to the place or seat where the augurs made their observations.

THACONA, in Ancient Geography, a town of Aisa, in Babylonia, upon an arm of the Euphrates. Ptol.

THACES, a people of Scythia, on the side of the Imaus, and near it. Ptol.

THACK TYLES. See TYLE.

THALEMA, in Ancient Geography, a town in the interior of Arabia Defera. Ptol.

THANA, or TIANE, a town placed by Strabo, Pliny, and Ptolemy, on the coast of Africa, towards the commencement of the Ifeer Syrtes.—Also, a town of Asia, in Syria, situated, according to Ptolemy, in Cyrrhetica. THAGIA, in Geography, a town of Africa; 100 miles S.S.W. of Fez.

THAGORA, TINGORAN, in Ancient Geography, a poit of India, at the bottom of a small gulf, in the easter part of the peninsula, beyond the Ganges.

THAGULIS, a town of Africa, situated between the Two Syrtes. Ptol.

THAHAR KIAEN, in Geography, a poit of Chinese Tartary; 15 miles N.E. of Ticutac. THAHATH, in Ancient Geography, the place of the 23rd station of the Israelites, where they encamped, after having left Mauloth; situated in the desert of Arabim, S. of Gauloth.

THAINNE, in Geography, a town of Africa, in the kingdom of Tunis, near the east coast, but without a harbour, at a small distance from the mouth of a river of the same name; 120 miles S. of Tunis.

THAIS, a town of France, in the department of Paris; 2 leagues S.S.E. of Paris. THAIS, a name given by Agineta to a cosmetic cream, intended to give a beautiful red to the face. Galen uses the same word to express a sort of handbag.

THALA, in Ancient Geography, a town of Africa, in Numidia, according to Sallust and Tacitus.—Also, a mountain of Africa, in Interior Libya, and the people inhabiting its vicinity were called Thale.

THALACH, in Geography, a river of Bavaria, which runs into the Schwarza; 5 miles W. of Greding.

THALAMENUS, among the Ancient, a ship of pleasure, or yatch used by princes. It was always provided with a good cabin, or bed-chamber. See SHIP.

THALAMI NERORUM OPTICORN, in Anatomy, two eminences in the brain. See BRAIN.

THALAMA, in Botany, one of the kinds of Apothecium, or receptacle, is so denominated by Acharius.

THALAMII, among the Ancient, theowers who fat in the lowest part of the ship. See the next article.

THALAMITE, in Ancient Geography, a term used to express those rowers in the polyere galley, or those who contained several series of rowers, who sat on the thalami of the vessel, and made the lowest row. These moved their oars and hands under the seats of the row that sat next above them. See POLYEREOTA.

THALAMIIUM, among the Ancient, a port-hole, through which the oars of the rowers in the bottom of the ship went.

THALAMUS, in Botany, a term used to express that part of the flower in the capitated or flosculous-flowered plants, where the embryo fruits of every separate flower are lodged, and where afterwards the seeds are contained. This is the bottom of the cup, in the central part of which it adheres to the calix.

THALASSAR, in Ancient Geography, a province of Asia, between Mesopotamia and Armenia.

THALASSOMELI, the name of a medicine used as a purge among the ancients. It was composed of equal parts of honey, sea-water, and rain-water, exposed to the sun in the dog-days, in a vessel pitched on the inlet. It purged in the same manner that sea-water alone would do, but only in a milder way.

THALASSUS, in Ancient Geography, a town or port in the southern part of the isle of Crete.

THALATHA, a town of Asia, in Babylonia, on the banks of the Tigris, and S. of Apamea.

THALATTA, a lake or marsh, at the foot of mount Caucasus, in the environs of the people called Corzesi. It discharged its waters into the Euxine sea, near a place called Bebaea-Ponti.

THALBIS, a river of Albania, between the Gerrus and the Soanes. Ptol.

THALEA, a town of Palatine, in the tribe of Simcon, according to the book of Jobuma.

THALER, in Commerce. See RIXDOLLAR.

THALES, in Biography, the founder of the Ionic school, and of the scientific method of philosophizing among the Greeks, was born of Phenician parents, at Mileus, in the fifth year of the 35th Olympiad, or about the year 580 B.C. He acquired wealth and distinction among his compatriots, and was employed at an early age in public affairs. He declined involving himself by marriage in the cares of a family, that he might devote his whole time and attention to the study of philosophy; alleging, as it is said, to his mother, who urged him to marry, at an early age...
"wisdom, and at a more advanced period "it is too late." In order more entirely to divagate himself from every avocation that would divert his mind from his favourite pursuits, he committed the care of his estate to his sister's son, whom he adopted. In search of wisdom, he travelled to Crete, and afterwards to Egypt. From the priests at Memphis in the latter country, he is said by several writers to have gained his knowledge of philosophy and mathematics. But it is more probable that he was more indebted to his own talents and affinities in the exercise of them, than to any communication from them; and accordingly it has been affirmed, that he taught them how to measure the height of their pyramids. Upon his return to Miletus, he was universally respected for his extraordinary wisdom and learning; and his acquaintance was eagerly courted by all who wished to improve in knowledge or to be ranked among philosophers. He was not prevented, however, by these engagements from prosecuting his mathematical, philosophical, and metaphysical studies. In this course of improvement and usefulness, and of imparting, as well as of acquiring knowledge, he professed his life to the great age of ninety years, and died, through mere infirmity, whilst he was attending the Olympic games. Thales was ranked among the seven wise men of Greece, and might justly be reckoned one of this number, whether we consider his ethical attainments, or the moral maxims and aphorisms which are ascribed to him. Of these maxims, we shall select the following: "Neither the crimes, nor the thoughts, of bad men are concealed from the gods. Health of body, competent fortune, and a cultivated mind, are the chief sources of happiness. What is the most difficult thing? To know one's self. What the easiest? To give advice to others. How shall we best attain to virtue? By abstaining from all that we blame in others. Parents may expect from their children that obedience which they paid to their own parents. Take more pains to correct the blemishes of the mind, than those of the face. Stop the mouth of slander by prudence. Be careful not to do that yourself, which you blame in another. Friends should be remembered when absent, as well as when present." —Laertius. Brucker by Enfield, vol. i. For an account of his philosophical doctrines and other particulars, we refer to the article Ionic Sect.

THALETAS of Crete, a famous lyric poet, celebrated by all antiquity as a musical musician, is said to have delivered the Lacedemonians from the pestilence by the sweetness of his lyre; but credulity in the powers of music must be very strong indeed, in those who could believe it possible for music to drive away the pestilence. Thaletas, however, was universally believed to have poissied this power; but it is impossible to render the fact credible, without qualifying it by several circumstances omitted in the relation. In the first place, it is certain that this poet was received among the Lacedemonians during the plague, by command of an oracle; that by virtue of this mission, all the poetry of the hymns which he sung, must have consisted of prayers and supplications, in order to avert the anger of the gods against the people, whom he exhorted to sacrifices, expiations, purifications, and many other acts of devotion; which, however superstitious, could not fail to agitate the minds of the multitude, and to produce nearly the same effects as public fasts, and, in Catholic countries, processions, at present, in times of danger, by exalting the courage, and by animating hope.

The disease having, probably, reached its highest pitch of malignity when the musician arrived, must afterwards have become less contagious by degrees; till, at length, ceasing of itself, by the air wafting away the seeds of infection, and recovering its former purity, the extirpation of the disease was attributed by the people to the music of Thaletas, who had been thought the sole mediator, to whom they owed their happy deliverance.

This is probably what Plutarch means, who tells the story; and what Homer meant, in attributing the effulgence of the plague among the Greeks, at the siege of Troy, to music.

"With hymns divine the joyous banquet ends,
The Paean lengthen'd till the sun descends:
The Greeks reftor'd, the grateful notes prolong:
Apollo listen, and approves the song."

Pope's Homer's Iliad, book i.

For the poet, in this passage, seems only to say, that Apollo was rendered favourable, and had delivered the Greeks from the scourge with which they were attacked, in consequence of Chryseis having been restored to her father, and of sacrifices and offerings.

This poet-musician has been confounded by some writers with Thales the celebrated Milesian philosopher; but according to Plutarch (in Lycurgus) he was cotemporary with Lycurgus the Spartan legislator, and lived about three hundred years after the Trojan war. Plutarch also informs us, that though Thaletas was only styled a lyric poet and musician, he was likewise a great philosopher and politician; inasmuch that Lycurgus brought him from Crete, when he returned from his travels, to Sparta, in order to have assistance from him, in establishing his new form of government. His odes, continues Plutarch, were so many exhortations to obedience and concord, which he enforced by the sweetness of his voice and melody. Plato, likewise, describes his captivating manner of singing; and Plutarch, in his Dialogue on Music, ascribes to Thaletas many musical compositions and inventions: such as Paean, and new measures in verse, as well as rhythms in music, which he had acquired from the flute-playing of Olympus, whom he first had imitated. Porphyry, in his Life of Pythagoras, says that this philosopher used to amuse himself with singing the old Paean of Thaletas; and Athenæus likewise tells us, that the Spartans long continued to sing his airs; and, according to the scholiast on Pindar, this poet-musician was the first who composed the Hyparchaeons for the armed, or military dance.

There was another poet and musician of the name of Thaletas, who was likewise a Cretan, but who flourished much later than the cotemporary and friend of Lycurgus.

THALFANG, in Geography, a town of France, in the department of the Sarre; 11 miles S.S.W. of Traarbach.

THALHEIM, a citadel of Bavaria, in the territory of Nuremberg; 6 miles S.E. of Herrbruck.

THALIA, in Botany, was so named by Linnaeus, in memory of John Thalius, a physician at Nordhausen, in Germany, who wrote Sygna Hercynia, a catalogue of the plants of the Hercynian forest towards Saxony, which accompanies the Hortus Medicus of Joachim Camerarius, both having been printed together at Frankfort on the Main in 1588; and they are both illustrated by excellent wooden cuts. Thalius died in 1587, of a fractured thigh, in consequence of a fall from his carriage. His work abounds with original descriptions and remarks; but as Haller observes, it is not easy to ascertain all the numerous species or varieties of which he treats. The genus before us was originally called CORTUSA by Plumier; but that name remains with a very different plant, as the reader will find its proper place.—Linn. Gen. 4. Schreb. 6. Wille Pl. v. 1. 15. Ait. Hort. Kew. v. 1. 3. Rolsoe T.
Between the 791, 1810, Curt. 791, 1810, Curt. ftyle Ic. Living T. next Peronia; (Cortufa the I. A Seed Redout. five the large South the the I. anther foliary, 108. 340. no arrived, for f. generic height, may figure, Cuba, in awl-fliaped tlian the Tube Juff. 307. Gen. it fares. albumen, 340. ovate. deep the Tube — 8. 340. ovate. oval, two-lipped Stam. Filament three-lobed, with one, attached to its its length, inferior, which has accumulated, do not belong to it; and that what Rottboll has described and figured, seems more akin to T. cannaformis, hereafter mentioned. We have indeed specimens, gathered by Mr. Frazer in 1810, in Cuba, near the Hannaban, which greatly reemember Plumer's figure, and may be his plant, though from the impossibility of examining their fructification, we dare not attempt them to be so. Nevertheless we shall describe them, that botanists may form their own opinion. The stem is several feet in height, erect, round, smooth, leathery, alternately branched. Leaves alternate, ovate, pointed, smooth, above a foot long, with one rib, and many fine transverse curved veins. Footstalks filiform, comprefsed, half as long as the leaf, with an oblong liniform knot at the summit. Panicle subdivided, at each subdivision. Flower-flask zigzag, knotty, round, two or three inches long. Partial bractes two at each knot, the outermost much the largest, embracing and concealing the other, an inch in length, elliptic-oblong, green, finely ribbed, clothed with scattered shining hairs. Between these bractes is situated a pair of flowers, whose dried corolla is partly purple, and whose pale, much convoluted and wrinkled lip bears some resemblance to Plumier's figure.

2. T. dealbata. Mealy Thalia. Roscoee Tr. of Linn. Soc. v. 8. 340. Dryand. in Art. n. 1. Pursh n. 1. Frazer's single plate. Curt. Mag. t. 1690. (Peronia firiéta; Redout. Liliac. t. 342.)—Leaves ovate. Flowers crowded. Bractes ovate, mealy.—Native of impenetrable swamps in South Carolina, flowering in August and September. Mr. Pursh says it was first discovered there by T. Millington, eqq. Living plants were brought to England by the late Mr. Frazer in 1791, by which this hand-fome and curious species first became known to botanists. Its root is of coarse perennia. Stem four or five feet high, erect, round, smooth; leafy at the bottom; pinnled at the top, covered with a filivry mealnkes, which clothes also the general as well as partial bractes, and is easily rubbed off by a touch. Leaves light green, smooth, above a foot long, on round sheathing stalls, with a knot at the top. General bractes lancelolate, concave, convolute, a fipan long. Flower-flanks aggregate or compound. Partial bractes crowded, in pairs, much more timid, ovate, and shorter than in the foregoing, each pair containing two purple flowers, whose structure is detailed in our generic character. Fruit purple, the fize of a hazel-nut, slightly pulpy.

3. T. cannaformis. Elliptical Thalia. Forl. Prodr. 1. Wildd. n. 3. Buchanan in Synn. Emphasly to Ava, ed. 2. v. 3. 305. t. 21.—Leaves elliptical. Partial bractes linear-lanceolate, shorter than the divided partial flower-flank.—Native of moif woods in the remote islands of the East Indies, and the New Hebrides, flowering in March and April. The stem is solid, branched, round, smooth, leafy, divericated at the joints. Leaves alternate, broadly elliptical, pointed, smooth, on round sheathing stalls. Panicle terminal, with long, flender, pendulous branches, upon which the flowers are arranged pretty closely. Every pair of long narrow partial bractes contains a divided flalk, bearing two large white flowers, each with the rudiment of another at its base. The corolla is somewhat tubular, and the lower lip of its inner limb has two large equal lobes, but in other respects the parts of fructification seem to answer well enough to the generic character. The fruit, however, which mufi settle that point, is unknown.

Our learned and highly valued friend Mr. Roscooe has sug- gested, that the Maranta Cachibeck, Jacq. Fragm. Bot. 52. t. 69 and 70, of which we have a specimen gathered by Mr. Maffon at St. Kitt's, may probably be a Thalia. Its feed certainly confirms this opinion, but the parts of the flower are not yet sufficiently described to authorize any conclusion, nor can we unravel their structure from the dried plant. Whatever becomes of this species, the Maranta Cachifeck, t. 63. f. 4. of the same work, and M. Ca- ]upita, t. 64. f. 2., mufi allured to be referred to the same genus.

Thalia, in Mythology, one of the nine Mufes, who pre- sided over comedy and pastoral. She is distinufhied from the other Mufes by her maff, and from the tragic Mufe by her shepheard's crook; her affect is likewise meaner than that of Melpomene, and her dress shorter and less noble than that of the other Mufes. Thalia was also the name of one of the Graces. THALICTRUM, in Botany, may possibly be, as gene- rally
THALICTRUM.

68. Wildl. n. 2. Ait. n. 2. "Waldfl. et Kutah-Hung. v. 2. 190. t. 174." (T. minimum maleficium; Buhl. Prodr. 147. Pluk. Phyt. t. 65. f. 4. Moris. sect. 9. t. 20. f. 13. T. n. 1140; Hall. Hist. v. 2. 58.)—Stem pinnate, round, leafy. Leaves triply compound, minutely downy on both sides. Flowers drooping. Petals lightly hairy. Stigmas variegated at the base.—Native of France, Switzerland, and Siberia, flowering in May. A species of a delicate aspect, and glaucous hue, about a foot high, with innumerable, small, round, lobed, tender leaflets. The petals are externally reddish, especially in the young plant, and finely downy or hairy. Stamens long and capillary. Seeds ovate, strongly furrowed, crowned with the permanent thrivalled stigmas, whose dilated or aliated base is distinguishable in our Swiss specimens. This last character is, in the Supplementum, p. 271, made the peculiar mark of T. flavidum, there described from a Siberian specimen, which Linnaeus did not recognize as his own T. faidiun. The flavidum, Wildl. n. 22, is therefore to be struck out. Several Swiss botanists have confounded the species before us with T. minus, hereafter described, which is Haller's n. 1139. That eminent writer had some doubts respecting the difference between the two, which we shall attempt to remove when we come to the other, Linnaeus having placed them far at under. The faidiun is said to exalt a very bad and powerful odour, like Geranium robertianum, or, as Haller says, the urine of cats.

3. T. tuberosum. Tuberous-rooted Meadow-rue. Linn. Sp. Pl. 270. Wildl. n. 3. Ait. n. 3. Mill. le. v. 177. t. 265 f. 2. (Oenanthe Myconi; Dalech. Hist. 785. Ranunculus thalictri folio minor, alsphodeli radice; Moris. sect. 4. t. 28. f. 13.)—Leaflets rounded, glaucous, smooth. Petals five. Root tuberous.—Native of Spain and the Pyrenees. A hardy perennial in our gardens, flowering in June, but confined to the more curious collections. The root conhilts of ovate knobs. Herb smooth, a foot or more in height, of a light glaucous green. Flowers pinnate, not numerous, distinguished by their five large, ovate, white petals, and small stigmas. Morison's figure is badly copied from that of Dalechamp.


5. T. dioecum. Dioecious Early Meadow-rue. Linn. Sp. Pl. 768. Wildl. n. 5. Ait. n. 5. Pursh n. 2. Mulhenb. Cat. 54.—Leaflets heart-shaped, many-lobed, very smooth. Panicles axillary. Flowers dioecious. Petals not longer than the filaments or germens. Stigmas almost capillary.—Native of shady woods and the hanks of rivers, from Canada to Virginia, flowering from May to July, according to Pursh, who says the flowers are white. He conceives his plant to be the same with T. lewisiiatum of Michaux, Fl. Borcali-Amer. v. 1. 322, who confesses his inability to determine the North American Thalictr, they being almost all dioecious. Specimens from the late Dr. Mulhenn, now before us, and agreeing exactly with those sent by Kalm to Linnaeus,


Gen. Ch. Calath leaves, none, the corolla be taken for such. Cor. Petals four or five, roundish, obtuse, concave, deciduous. Stam. Filaments numerous, dilated upwards, compressed, less than the corolla; anthers terminal, ob-long, erect. Pist. Germens superior, numerous, mostly flattened, roundish, igles none; stigmas thickish. There are also several very short imperfect pistils. Peric. none. Seeds several, ovate, furrowed, without any appendages. Eff. Ch. Calyx none. Petals four or five. Seeds naked, without appendages.

Obf. Linnaeus remarks, that his T. tuberosum and cor-nutum have five petals; dioecus has the flaments and pillifs on separate plants; aquilegelhium and contortum have flapped pendulous seeds, furnished with three dilated or winged angles; moreover, that the number of flaments and pillifs differs in the different species, being sometimes less than the characters of the clays and order require.

This is a very distinct well-marked genus of perennial herbaceous plants, all natives of the cold or temperate climates of Europe and North America. The leaves are compound, with roundish, rarely oblong, lobed or notched leaflets; paler, or glaucous, underneath; usually smooth. Inflorescence pinnate. Flowers white or yellowish, with some light ting of purple, generally of an elegant feathery appearance. Fourteen species are defcribed in Linn. Sp. Pl.; twenty-one in Syft. Veg. ed. 14. Willdow has twenty-three. Four are British. Nineteen are enumerated in Mr. Aiton's Hortus Kewensis. Their qualities in general are believed to be of an acrid nature, like those of Ranunculus and Clematis; but milder.

We have some additions and corrections to make, which require a compendious review of the whole genus.

1. T. alpinum. Alpine Meadow-rue. Linn. Sp. Pl. 767. Wildl. n. 1. Fl. Brit. n. 1. Engl. Bot. t. 262. Lightft. 286. t. 13. f. 1, Fl. Dan. t. 11. (T. minimum montanum atro-rubens, folio splendentibus; Ralt. Syn. 204. Boerh. Ind. Alt. v. 1. 44. t. 1.)—Stem perfectly simple, and almost naked. Clusters simple, terminal.—Native of moist black bogs, or the turfy margins of alpine rides, on the loftiest mountains of Lapland, Scotland, and Wales, flowering in June. The root is perennal, creeping, with a few fimple fibres. Stem erect, about six inches high, round, glaucous or purpilish, in one leaf, more or less leaved, compound, about the middle. Radical leaves several, flattened, erect, half as tall as the stem; first ternate, then either again ternate, or pinnate; the leaflets roundish, or wedge-shaped, veiny; glaucous beneath. Clusters at first drooping, then erect, of eight or ten alternate flowers, whole petals, and eight or ten filaments, are either white or purple; their anthers orange. German two or four only, roundish, green, each with a whith, broadly-lanceolate, divaricated, downy stigma, about its own length. Linnaeus describes twelve flaments, and eight piliils.

**THALICTRUM.**

Linnaeus, as recorded in Sp. Pl., are certainly dioecious, about a foot high, very smooth, with three-ternate leaves, whose lobes are usually from five to seven, blunt, and rather shallow; both their surfaces reticulated with slightly prominent veins. *Panicles* solitary or in pairs from the axils of the leaves, somewhat umbellate, on long stalks, and often accompanied by a long-flaked solitary flower. *Panels* of the male flowers white or reddish, ovate, ribbed, the length of the very slender numerous *filaments*, whose anthers are yellow, very narrow, pointed: those of the female flowers much smaller and rounder, white or greenish, hardly so long as the little, oval, ribbed *germin*.

*The Pigeons* are very slender, and remain in a prominent, almost capillary, form, on the ovate-oblong, flattened seeds.


7. *T. majus.* Greater Meadow-rue. Jacq. Auctr. v. 5. 9. t. 420. Willd. n. 7. Fl. Brit. n. 3. Engl. Bot. t. 611. — *Leaves* roundish, somewhat heart-shaped, three-crested; glaucous beneath. Panicle leafy, with aggregate branches. *Flowers* drooping. — Native of woods and bushy places in Austria, Hungary, Mount Athos, and the north of England, perennial, flowering in June and July. The late Mr. Robson of Darlington found it at Baydals, near that town, as well as on the margin of Ullswater, Cumberland. This is about the size of the last, but the leaves are of a darker green on the upper side, very glaucous beneath. The branches of the panicle grow several together, from the axils of the upper leaves, and the flowers, at least their *flamens*, are pendulous, with longer *anthers* than the preceding. The petals moreover are green. In the *germin* and *Pigeons* we perceive no particular distinction.


11. *T. fistuliferum.* Siberian Meadow-rue. Linn. Sp. Pl. 769. Willd. n. 11. Ait. n. 11. (T. orientale minimum, fumarize folio ; Tourn. Cor. 20. Willd.) — "Leaves in three divisions; *leaves* somewhat reflexed, sharply cut. *Flowers* drooping." — Found by Gmelin in Siberia; and by Tournefort, if we are right in his synonym, in Armenia. Linnaeus doubtfully cites a synonym of Seguir, which, after Haller, we have referred to *T. minus*. His account of the present species, of which we know nothing, is, that its habit accords with *T. minus* or *purpurascens*, but the leaves are small, but one-sixth as large as those species, glaucous like Rue or Fumitory. *Stem* green, copiously panicked. *Panicle* brown at its dichasium. It flowers later, at the same time as *flamum* and *dioicum*.

12. *T. squarrosum.* Squarrose Meadow-rue. Willd. n. 12. — "*Leaves* three-crested or undivided. Footstalks membranous, winged, clasping the stem. *Flowers* drooping." — Native of Siberia. Differs from all the foregoing species which have drooping *flowers*, in the structure of its footstalk. The leaves are repeatedly compound, as in the reit; their lateral *leaves* mossily ovate, acute, and entire, but the terminal, and even the uppermost lateral ones, are divided or three-crested. *Footstalk* greatly dilated at the base, with orbicular membranous wings, toothed at the margin. There are also leifer orbicular toothed *auricles*, upon the partial footstalks, by which mark the species is easily known. *Wildieu.* We have met with nothing answering to this description.

THALICTRUM.

The leaves are nearly round, flowers drooping. Stamens coloured "— On dry sandy hills, in Pennsylvania and Virginia. Perennial. Stem and flowering in May and June. A small plant. Stipules and leaflets purple. Pursh. Linnaeus contrasts this with T. minus, a species concerning which his ideas were too vague for us to learn any thing from such a comparison, nor does his herbarium lead us any certain aid. There is, however, an unmarked specimen, which he associated with T. dioicum, but which may possibly be the purpureum. It has broad leafy-like leaflets, but is more particularly distinguished by short elliptical anthers, whose stamens are gradually dilated upwards, approaching to those of T. flavium hereafter described.


A tall species, with white flowers. Pursh. We have this from our late venerable correspondent, the Rev. Dr. Muhlenberg. The leaflets are rather large; dark green, and somewhat rugged, above; paler, reticulated with prominent veins, and minutely downy, at the back. Flowers nearest to those of T. dioicum, and like them distinguished by long tapering filaments. The anthers are linear-oblong; their stamens almost equally slender throughout.

15. T. angustifolium. Narrow-leaved Meadow-rue. Linn. Sp. Pl. 769. Willd. n. 14. Ait. n. 13. Jacq. Hort. Vind. v. 3. t. 25. t. 43. — Leaflets linear-lanceolate, or linear, mostly univerted, entire. Panicle much branched, dense. Flowers erect. Stigmas heart-shaped, half the length of the stamens. Native of Switzerland and Germany, but not frequent anywhere. Dr. Sibthorp, however, gathered it on the Bithynian Olympus. Miller feems to have cultivated it, in his time, at Chelsea, but we have scarcely ever seen a living specimen, and we are much inclined to concur in opinion with those who judge it a variety of the following, their habit, inflorescence, and flowers, being exactly the same, however different the breadth of their leaflets. Baulin's synonym, uniformly referred to this, certainly belongs to T. simplex, n. 17.


17. T. simplex. Simple-ruled Meadow-rue. Linn. Mant. 78, excluding the synonynm. Willd. n. 17. Ait. n. 15. Fl. Dan. t. 244. Ehrh. Phytoph. 15. (T. angustifolium; Villars Dauph. v. 3. 712. T. angustifolium folio; Bauh. Prodr. 146. Moris. fœct. 9. t. 20. f. 8.) — Leaflets linear. Stem angular, simple. Panicle branched, compound, lax, somewhat racemose. Flowers pendulous. Stigmas roundish-heart-shaped,— Native of Sweden, Denmark, Switzerland, and France. Introduced at Kew by the very eminent cultivator and botanist M. Thouin, in 1778. It is a hardy perennial, flowering in May and June. This is unquestionably akin to the last, but essentially different. The whole plant is but half as large, with a much more angular stem. The leaflets are extremely narrow, and revolute, unaccompanied by any of the partial stipulatory scales, seen on the leaves of T. flavum. The panicle is more oblong and lax, not comybofus. Flowers smaller, drooping, or rather quite pendulous, not erect. Petals green, not white or yellowish. Stigmas remarkably round and convex. We have specimens from Villars, which prove the correctness of Willdenow respecting his synonym. We have also from professor Lachenal a specimen gathered at Michel- feld, which shews this to be the plant of Baulin, cited by Linnaeus and others for T. angustifolium. Indeed Baulin's wooden cut, copied by Morison, sufficiently evinces this, though, being delineated perhaps from a dried specimen, it is not exact in the position of the flowers. T. gallowan, Willd. Enum. Hort. Berol. 585. we believe is a very narrow-leaved variety of simplex.

18. T. lucidum. Shining-leaved Meadow-rue. Linn. Sp. Pl. 770. Willd. n. 18. Ait. n. 16. (T. minus lucidum, libanoqidos coronaria folis; Pluk. Phyt. t. 65. f. 5.) — „Stem leafy, furrowed. Leaflets linear, fleshy." — Said to be a native of France and Spain. Miller had something in his garden which passed for this plant, and hence it is enumerated in Hort. Kew. We have never seen a specimen, nor did Linnaeus know any more of the matter than what Dalibard, whose specific character we more exactly copy, has given in his fl. Paris. 162. The late Mr. Davall sent us a Swis Thalictrum for lucidum, which answers to the character, but is indubitably the simplex in a luxuriant state. Linnaeus thought the lucidum was probably a variety of flavum. We preume various things have been taken for this plant, but in reality that it has no existence as a species.

19. T. aquilegifolium. Coburn-leaved Meadow-rue, or Feathery Coburn. Linn. Sp. Pl. 770. Willd. n. 19. Ait. n. 17. Jacq. Auct. v. 4. t. 40. t. 318. Curt. Mag. t. 1818. (T. sanguifolium; Jacq. Hort. Vind. v. 3. 34. t. 61. T. majus, folium flaminibus purpurascetibus; Bauh. Pin. 337. Moris. fœct. 9. t. 20. f. 16.) — Leaflets rounded, lobed, and cut. Stem round. Panicle comybofus. Flowers erect. Stamens dilated upwards. Germens flaked. Fruit pendulous, with three dilated wings.— Native of Sweden, Germany, Switzerland, Thrace, and Greece, common and hardy in our gardens, flowering from May to July. The stem is three or four feet high, round, somewhat furrowed, leafy, smooth, either glaucous or purple. Leaves large and spreading, much resembling those of Aquilegia vulgaris, though often more acute. Flowers large and elegant, white or pale violet; their petals reflexed; their very numerous stamens moderately dilated upwards, flattened, of the hue of the petals, with yellow anthers. Germens triangular, on long stalks, at length deflexed or pendulous, and becoming somewhat obovate, obtuse, straightish seeds, with three unequal, much dilated, smooth wings.
wings. Retzius, in his Olf. Bot. sive. 6. 30. sect. 52, justly indicates the identity of Jacquin's T. atrupurpureum and the Limnae aquilegifolium, confessing he could not decide concerning the aquilegifolium of Jacquin. We have a wild Swiss specimen of the latter, Hallier's n. 1141, precisely answering to the plate in Pfl. Austria, and certainly not differing in any essential character from the true plant of Limnae, so frequently cultivated for ornament, and preferred in his herbarium.

20. T. contortum. Twisted-fedeed Meadow-rue. Linn. Sp. Pl. 775. Am. Acad. v. 4. 47. Willd. n. 20. Ait. n. 18. Fruit pendulous, triangular, contorted. Stem rather two-edged.—Native of Siberia. Limnae thought it a hybrid offspring of aquilegifolium impregnated by the minus. His specimen is not to be distinguished from the former, and we cannot but agree with Willdenow's remark, that the contortion of the leaves is merely a sign of imperfection. Neither can any more fold dependance be laid on the comparative number of the parts of fructification, on the white colour of the flowers, or the humbler stature of the herbage. We conclude this fupposed species therefore to be hardly a separate species as a variety of the last.

21. T. petiolatum. Darvian Meadow-rue. Linn. Sp. Pl. 771. Willd. n. 21. Ait. n. 19. (T. flamineum; Linn. Suppl. 271.)—Leaflets rounded, obtuse; partly three lobed. Stem nearly leafless. Panicle somewhat umbellate. Stamens much dilated, linear-obovate. Gernerns fessile.—Native of Siberia. Mr. Lodigies is said to have introduced this curious and very distinct species to the knowledge of our cultivators, in 1796. It has a perennial root, with long, fimple, rather fleshy ftripes. Stem fimpie, about a foot high, ftriated, purple at the bottom, leafless, except an occafional leaf, accompanying a fmall lateral branch. Radial fefles two, spreading, thirfe compouneed, on purplie ftalks; leaflet very much like Common Rue, but smaller. Flowers white, large but not numerous, in a fort of corymb, or imperfet mmbellate, accompanied by a few small leaflets. Petals roundifh, deciduous. Stamens very numerous, white, flat, and sinularily dilated, with a mid-rib; their anthers yellow, narrow and fhort. Gernerns ovate, ribbed, with aw-conditioned recurved wing. Willdenow makes T. flamineum a variety, little supposing that the very identical specimens, fo minutely and accurately defcribed in the Species Plantarum, could be again defcribed, without a reference, in the Supplementum.

We have to exclude T. japonicum, Thunb. Tr. of Linn. Soc. v. 2. 337. Willd. n. 22, a fpecimen from Thumberg himfelf proving it to be no other than Coptis afflfensifolia of Mr. Sallybur, Tr. of Linn. Soc. v. 8. 303, a circumstance as wonderful as that its discovery fhould ever have thought this plant similar to a Solanum. See Pl. Aps. 564.

22. T. ranunculifum, Willd. Enum. Hort. Bor. 585. Pursh n. 6, having simpie leaves, and being not noticed as a Thal- lidium by Muhlenberg himfelf, who is quoted for it, is, we presume, hell oif ferved as well as T. continental, Willd. Enum. 584, which is probably comprehended under one of the foregoing species.

Thalictrum, in Gardening, contains plants of the hardy, herbaceous, fibrous-rooted, perennial kinds, among the number of which the species mostly cultivated are; the tuberous-rooted meadow-rue (T. tuberofum); the Canadian meadow-rue (T. cornuti); the fetid meadow-rue (T. fclidum); the narrow-leaved meadow-rue (T. anguillifolium); the shining-leaved meadow-rue (T. lucidum); and the columbine-leaved meadow-rue, or feathered columbine (T. aquilegifolium).

In the second fort there is a variety, which is smaller, with pale purple filaments, than the common kind.

Also in the fifth fort there are varieties with a green ftalk and white filaments, and with a purple ftalk and filaments. Besides, there are other forts that may be cultivated for variety.

Method of Culture.—All the forts are readily increafed by parting the roots, and planting them out in the autumn: when the ftems decay, or in the fpring before the new ones are set forth, the strongest where they are to remain, and the weaker ones in nurfery-rows for further growth: they may also be raised from seeds, which fhould be fown in a bed or border in the fpring: when the plants rife, they fhould be kept clean, and be planted out where they are to remain, in the following autumn. They are all hardy durable plants that fucced and grow well in any common foil and exposure in the open ground, but which flourifh most in mild fady situations. They afford variety in the borders, and other parts of ornamented grounds, when set out in a properly varied manner, requiring but little trouble or attention in such situations.

Thalina, in Ancient Geography, a town of Asia, in the Greater Armenia, upon the banks of the Euphrates.

Thallaba, Talaban, a town of Asia, in Mero- potamia, upon the banks of the river Chabors, situated E.S.E. of Retzius.

Thalland, in Geography. See Dalia.

Thallite, in Mineralogy; Epidote, Harly; Delphinius, Saufrure; Short vers du Dauphin, Rome de Bike; Aquaticus, dendrada; Pijluc, Werner. Few minerals have received so many names as this; it is at present better known by the name of epidote or thallite. It has frequently been confounded with aclinolite or strafheimen, and with green hornblende and green aiferus. Some account of this mineral is given under Piectite. We shall here add its diflinctive characters and confiuent parts. From aclinolite it may be distinguished by the colour, the latter being generally a lighter green. The flature of the maffive varieties of aclinolite is generally radiated, that of epidote compact or foliated. Both the joints of aclinolite are diftinately fen; but in epidote, frequently one joint only is fen. Epidote melts into a blackish fcoria before the blowpipe, and it is harder than aclinolite or hornblende; the latter has generally a different flade of green; the flature of hornblende is also less vitreous than that of epidote. Green aiferus is soft when fponded; the powder of epidote is harf and rough. Thallite or epidote occurs both maffive and cryftalized. The joints are in two directions, one of which is more obvious than the other. The alternate angles are about 114°3 and 65°3; the crofs flature is fimplicity. The primitive form of the cryftal is a prism with bhom- boidal bafe. The moff common forms are fix or eight- fided prisms, of which four are larger than the others. These prisms are terminated by feveral oblique planes, and are often flatly acumiated: the terminating planes of the cryftals are smooth, and have a high natural polish; they are fometimes convex. The lateral planes, or fides of the cryftals, are ftriated. This mineral is found in beds and veins, and fometimes as a confiuent part of rocks. It is associated with augite, garnet, hornblende, quartz, calcareous fpar, and magnetic iron-ftone. The varieties that occur in veins are of a lighter colour, and the cryftals are more aecinar than those which are found in beds. The veins contain felpar, azinite, rock-cryftal, chlorite, and other minerals: the epidote forming only a small part of the fubflance of the vein. It is found in several parts of the Scotch Hebrides, and in various Alpine districts, in sienite, porphyry, and granitic rocks. The feim cryftals have been procured at Arundel in Norway. The con-
fluent parts of this mineral, from different situations, agree more nearly than is frequently the case with other minerals.

<table>
<thead>
<tr>
<th>Substance</th>
<th>From the Valais</th>
<th>From Offanta</th>
<th>From Arundel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silica</td>
<td>37.0</td>
<td>37.0</td>
<td>37</td>
</tr>
<tr>
<td>Alumina</td>
<td>26.6</td>
<td>27.0</td>
<td>21</td>
</tr>
<tr>
<td>Lime</td>
<td>20.0</td>
<td>14.0</td>
<td>15</td>
</tr>
<tr>
<td>Oxide of iron</td>
<td>13.0</td>
<td>17.0</td>
<td>24</td>
</tr>
<tr>
<td>Oxide of manganese</td>
<td>0.6</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Water</td>
<td>3.8</td>
<td>3.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Lofs</td>
<td>1.1</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

It differs in chemical composition from hornblende and actinolite, by the absence of magnesia, and by the large proportion of alumina which it contains.

**THALLOPHORI**, χαλλόφοροι, in Antiquity, the old men and women, who, in the procession of the festival pana-chiron, carried olive-boughs in their hands.

**THALLUS**, in Botany and Vegetable Physiology, χαλλος, an olive bough, or a green bough; from χαλλος, to stand erect, to float, or to spread abroad; a term aptly enough chosen by the distinguished professor Archibald, for the frond, or foliage, of a *Lichen*, whether that part be of a leafy, fibrous, scaly, or crustaceous nature. But this term, however apt, is superficial, from, used by Linneus, being synonymous with it, and sufficient for every requisite purpose. See *Lichen* and *Lichenes*; also *Frond*.

**THALMANSFELD**, in Geography, a town of Germany, in the margravate of Anspach; 4 miles W. of Thalmassing.

**THALMESSING**, or Thalmensingen, a town of Germany, in the principality of Anspach; 31 miles S.E. of Anspach. N. lat. 49° 1'. E. long. 11° 10'.

**THALMIS**, or Talmis, in Ancient Geography, a town of Egypt, between Taphis and Tutzis. Anton. Itin.

**THALPUSA**, a town of the Peloponnesus, in Arcadia; which belonged to the Orcemenians.

**THALSEA**, or Thelsea, a town of Phœacia, marked on the route from Remmaris to Neapolis, between Geroda and Damaceus.

**THALUDA**, a river of Africa, in Mauritania Tingitana, the mouth of which is placed by Ptolemy on the coast of the Iberian sea, between Jagath and the promontory Oleslrum.

**THALYSIA**, χαλλος, in Antiquity, a sacrifice offered by the husbandmen after harvest. For the origin and ceremonies of which, see Potter, Aubach. Grec. tom. i. p. 400.

**THALAMAPATHRA**, See *Folium Indicum*.

**THAMAR**, a word used by the Arabian physicians to express a date. Hence a pectoral decoction, made with dates and other ingredients, was called *diathamyrin*; and the word was afterwards corruptly written *decameron*.

**THAMAR**, in Ancient Geography, a town of Judea, near Malis or Malath, which, according to Eusebius, had a Roman garrison.

**THAMARITA**, a town of Africa, in Mauritania Caærenis.

**THAMARO**, a town of Palestine, on the western side of Jordan. Ptolemy.

**THAMSALITIS**, a town of Africa Propria, on the route from the Greater Leptis to Tacupa, between Thamudifis and Thentei. Anton. Itin.

**THAMBES**, in Geography, a mountain of Algiers; 30 miles S. of Donz.

**THAME**, See Team.

**THAME, or Tame**, in Geography, a market-town in a hundred of the same name, and county of Oxford, England, is situated on the banks of the river Thames (whence it derives its name), at the north-eastern extremity of the county adjoining to Buckinghamshire, 13 miles E. from Oxford, and 46 miles N.W. by W. from London. Dr. Stukeley calls this place Tame, and it is unquestionable that a Roman military road went through the town, though it was by degrees neglected in the latter times of the empire. Thame was a place of some consequence in the tenth century; for we find that Wulfere, king of Mercia, granted a charter to the vill called Thame; and in the year 970, Okekeley, archbishop of York, is known to have died here. In 1010, when the Danes over-run these parts of the kingdom, this town, among others, suffered severely. The Domesday record describes the manor of Thame as a part of the bishop of Lincoln's extensive possessions in Oxfordshire. Leland says, "about Alexander, bishop of Lincoln's time, the town of Tame, being the king's, was given for rent, in fee-farm, to the bishop of Lincoln and his successors." To the patronage of the bishops the town was indebted for numerous advantages. By them the church was erected, the vicarage and a prebend endowed, and a neighbouring abbey reared. Through their intercessions the fairs and market were granted; and Henry Lexington, bishop in Henry the Third's reign, rendered an important service, by turning the high road through the middle of the town. Thame continued dependent on the bishops till the reign of Edward VI., when the fee was demifioned of many of its valuable possessions. Sir John Williams obtained a grant of the estate, which, descending by marriages to the family of Bertie, it became vested in the earls of Abingdon, the present possessors. During the civil wars of the seventeenth century, Thame was surrounded by garrisons of the contending parties, and consequently experienced its full share of the miseries of that period. The town consists principally of one long and spacious street, gently rising from the river. The church is a large, well-built structure, of the cruciform description, and comprising a nave, two aisles, a north and south transept, and a chancel; with an embattled tower supported by four massive pillars. The interior exhibits numerous tombs and memorials of families once important in this neighbourhood. Near the church are the remains of the prebendal houses, which evince considerable former grandeur, and consist of nearly three sides of a quadrangle. A school, once of great celebrity, was founded here by John, lord Williams: the house is a spacious building, and the school of noble dimensions. Through the whole of the seventeenth century, this establishment maintained a high character: but has now fallen into dilapse; though the building is in excellent preservation. There is likewise a charity-school of an humble description for the education of twenty-five boys. Thame has a good weekly market on Tuesdays, and two annual fairs: the market is of ancient date, for we find that the prior of Rufford was restrained from holding a market at Haddenham, to the prejudice of that of Thame. In the year 1811, the number of houses was returned as 460; the population as 2328, of which more than half were paupers receiving alms from the parih. By the return of the expenses attending the maintenance of the poor in 1811, those of this parish amounted to 3680l., a sum exceeding the expenditure of any other parish in the county. The parish contains about 4500 acres of land, and is divided into six hamlets or liberties, Old Thame, New Thame, Priest End, Thame Park, Moreton, and North Weston: the town comprises the three first. In Thame park, about a mile from the town, flour an abbey of some importance, established by bishop Alexander in 1138. At the dissolution, the society consisted of an abbot and fourteen monks; and the annual revenue was 250l. 14s. 7d. The abbey, with all its poffessions, was surrendered to the crown by Robert Kyng, the last abbot, who, for his ready compliance, was on the erection of the fee of Oxford appointed its first bishop. On the feite of a part
a part of the abbey the present manufaet was built by Philip, the father of the late lord Wemans. Considerable fragments of the abbey still remain, which are protected by the modern elevation. The park contains about 220 acres, and is skirted by woodland.

Sir John Holt, the celebrated chief justice of the court of king's bench, was born at Thame in 1642, and died in 1709. (See Holt, Sir John.) — Beauties of England and Wales, vol. xii. Oxfordshire; by J. N. Brewer. THAMES, the name of the most important river of Great Britain, is pre-eminently distinguished for its commercial confluence, the scenery, edifice; and towns on its banks; for the bridges which are ranged across its channel; for the vast docks, quays, and warehouses which are annexed to it; and for the variety and interest of the historic occurrences which are connected or associated with its name. Yet, though occasioned at the present time, it was neglected in former ages; and it is singular to remark, that its sources and early progress have occasioned much doubt and dispute. Some topographers have assigned its origin to a spot in Oxfordshire, near the town of Thame; while others, with more regard to probability and record, have traced its source to a spring near Cricklade, in Wiltshire. In that district three or four streams emerge from the earth, and each of these has been honoured with the appellation of Thames-head: but at present it is very generally admitted, that this name strictly belongs to a fine spring, which rises in the parish of Kemble, in Wiltshire, about five miles N.W. of Cricklade, and two and a half miles S.W. of the town of Cirencester. Some writers state that the spring-head is in the parish of Cotes, and county of Gloucester. As a proof that this stream was designated as the Thames, or Tems, at an early period, we may refer to a Saxon charter of Malmbury Abbey, wherein it is named "Temens," as the boundary of certain lands. Again, some of the old Monkish historians state that the Danes crossed the Thames at Cricklade in the early part of the tenth century.

It has been erroneously said, that the name of this river is the Ipsi till it arrives at Dorchester, and receives the waters of the Thame, where it attained the compound name of Thames: Some old Oxford poets have given currency and celebrity to this story. Pope, in his "Windsor Forest," speaking of the union of various streams with this river, thus sings:

"First the famed authors of its ancient name,
The winding Ipsi, and the fruitful Thame;
The Kenne swift, for silver cels renowned;
The Lodden flow, for verdant alders crowned;
Cole, whose dark streams his flowery islands love,
And chalky Wey, that rolls a milky wave."

Denham, the poetical encomiast of "Cooper's Hill," thus characterises the Thames.

"My eye-descending from the hill, surveys
Where Thames among the wanton valleys flares.
Thames the most loved of all the Ocean's sons
By his old fire to his embraces runs;
Hafting to pay his tribute to the sea,
Like mortal life to meet eternity."

The nature of the present work will not allow of a particular description of the course of this river, with brief accounts of all the prominent objects on its banks. It must suffice to specify the names of the towns, chief seats, and prominent features; and refer to the former, under their respective names in the Cyclopaedia, for further information, and to such books wherein the said accounts are to be obtained. One characteristic of this river is entitled to notice; and which

fews, that at the original formation of rivers, and subdivision of lands in England, the Thames was at that time a noted and considerable stream. From the town of Cricklade, to its junction with the Sea at Sheerness, this river is a boundary, or natural line of separation, to counties. Soon after its source, it divides the counties of Wilts and Gloucester; next thores of Oxford and Berks, and Buckingham and Berks; afterwards Middlesex and Surrey; and, lastly, Kent and Essex. The Thames is also a navigable river nearly the whole of its course, and thus affords an easy and cheap passage for heavy goods from the ocean, and the port of London, to the interior parts of the island. By means of a canal, extending from the town of Lechlade, in a north-westery direction, to the river Severn, the latter great western river and the Bridit Channel are joined by a navigable course to the English Channel. See CANAL, THAME, and SEVERN.

As nearly the whole course of the Thames is through a plain or level country, we find its current is consequently low and irregular. For fifteen or twenty miles it is only a narrow and small stream, but after receiving the waters of several rivulets, it assumes a river-like appearance at Lechlade, and is capable of sustaining barges of 100 tons burthen. From that town (about 138 miles by water from London) to Sheerness, it is strictly a navigable river. In its course to the sea, the following rivers, besides several smaller streams, pour their waters into the Thames: the Wainfrith, Evenlode, Cherwell at Oxford, Thame, Kennet, Loddon, Coln, Wey, Mole, Brent, Lea, Roding, Dart, and Medway.

The following cities, towns, and large villages are seated on the banks of this river: viz. the cities of Oxford, London, and Westminster; the towns of Cricklade, Lechlade, Abingdon, Wallingford, Henley, Great Marlow, Maidenhead, Windor, Staines, Kington, Richmond, Brentford, Greenwhich, Woolwich, and Gravesend; the villages of Pangbourn, Wargrave, Eton, Datchef, Old Windor, Shepperston, Walton, Sunbury, Moulfe, Hampton and Hampton-Court, Twickenham, Hieworth, Barnes, Chivick, Fullham, Putney, Hammerfmith, Chelsea, Blackwall, &c. The banks of this river are altogether ornamented with the palaces of Windor, Hampton-Court, Kew, Fullham, and Lambeth: likewise the following distinguished seats of English nobility and gentry, besides several smaller villas, &c.; Nuneham-Courtney, Bafflon House, Combe Lodge, Purley, Park Place, Pawley Court, Culham Court, Temple House, Marlborough House, Bingham Abbey, Taplow, Chiefden, Cookham, The Willows, Beaumont Lodge, Oatlands, Garrick's Villa and Pope's Villa at Twickenham, Strawberry Hill, Thames-Ditton, Marble-Hill Cottage, the duke of Bedflegh's, lord inceant Sidmouth's, and Mr. Keen's at Richmond, Keppell House, Sion House, Brandenburgh House, and Ingrams. Among the numerous bridges which cross this national river, the following are justly noted either for their beauty or extent. The first stone bridge on its course is at Elmham, and the next at Lechlade; Oxford, Abingdon, Shillingford, Wallingford, Ca- verham, Henley, Maidenhead, Eton, Staines, Walton, King- don, Richmond, Kew, Fullham, Batteries, Vauxhall, (famed 1816) Westminster, the Waterloo and Southwark (now erecting from designs by that scientific engineer, John Rennie, eqd.), Blackfriars, and London. The last fix are to be said to belong to the metropolis. The jurisdiction of the lord mayor of London over the river Thames, extends from Coln-Ditch, near Stains, to Yendal or Yenlech, near Sheer- nes, and also includes parts of the rivers Lea and Medway. A very interesting account of the scenery and various ob- jects on this river, with numerous beautiful etchings by W. B.
THAMES, a river of New Zealand. Capt. Cook, Mr. (now Sir Joseph) Banks, and Dr. Solander, failed up this river in a pinasse; at about fourteen miles from the entrance, it is as wide as the Thames at Greenwich, and the tide at flood is as strong; it is not quite so deep, but has water enough for vessels of more than a middle size, and a bottom of mud so soft, that nothing could take damage by running afire. The course is from north to south, and the entrance between Cape Colville and Point Rodney.—Alfo, a river of Upper Canada, which runs into St. Clair, N. lat. 45° 15'. W. long. 82° 10'.—Alfo, a river of Connecticut, which runs into the sea, 4 miles below New London.

THAMESIS, called Jamija by Ptolemy, in Ancient Geography, a river of the isle of Albion. See Thames.

THAMETHIS, a town of Egypt. See Dametta.

THAMMUZ, in Mythology, is a name under which the Phenicians worshipped Adonis or Osiris.

THAMMUZ, in Chronology, a name given by the Jews to the tenth month of the civil year, containing twenty-nine days, and answering to our June.

THAMNA, in Ancient Geography, a celebrated town of Palestine, on the road from Diapholis to Jerusalem. It was the capital of the Thamnitic toparchy.

THAMNATH-SAAR, a town of Palestine, in Samaria, in the tribe and upon the mount of Ephraim, N. of mount Caas. This town was built by Joshua, and his tomb was there in the time of Jerome.

THAMNERIA, a town of Asia, in Media, in the neighbourhood of the country belonging to the Cadusi. Xenophon.

THAMNIIUM, in Botany, a very small shrubbery, from Thamnium, a shrub, and Thamus, a name chosen by Ventenat, in his Table du Regne Vegetal, v. 2. 35, for the shrubby kinds of Lichen, of which he makes a genus. Its character is

Several kinds of入股. Tubercles fuggous, coloured.

Lichen rangiferinus, and L. Racemula, are mentioned as species of this genus, which is now, like the rest of the author's labours in this department, disfigured, the whole tribe having been so much better studied and arranged by Acharius. See Lichenes.

THAMNOCHORTUS, so called by Bergius, from Thamus, a shrub, and στεφανος, a crown; alluding to the hard shrubby habit, and natural affinity of the plant. Berg. Cap. 353. t. 5. f. 8. This genus is now sunk in Restio (see that article); and the particular species is R. scavina of Thunb. Prodr. 15, and Wild. Sp. Pl. v. 4. 723, though those authors have used Thamnochortus as the specific name of another plant, immediately preceding this in Willdenow, who enumerates thirty species of Restio.

THAMNSBRUCK, or Thomasbruck, in Geography, a town of Saxony, in Thuringia; 8 miles S.E. of Mullhausen. N. lat. 51° 53'. E. long. 16° 43'.


THAMYRIS, a town of Macedonia, near the Danube. It was built, according to Jornandes, by Thamyris, queen of the Geete.

Thamyris, in Mythology, called Homer Kithabit, one who plays on the cithara, was the son of Philammon. (See his article.) Plutarch, in his Dialogue on Music, tells us that Thamyris was born in Thrace, the country of Orpheus, and had the sweetest and most sonorous voice of any bard of his time. Homer, in his catalogue of ships, where he speaks of the cities under the dominion of Neleus, mentions Dorion as the place where Thamyris contended with the Muses, whom he had the arrogance to challenge to a trial of skill in poetry and music. The conditions and consequences of this contention are fully described by the poet.

"And Dorion, fam'd for Thamyris' disgrace, Superior once of all the tuneful race, Till, vain of mortals empty praise, he froze To match the feed of cloud-compelling Jove! Too daring bard! whose unsuccessful pride Th' immortal Muses in their art defy'd: Th' avenging Muses of the light of day Depriv'd his eyes, and frate'd his voice away; No more his heavy voice was heard to sing, His hand no more awak'd the silver string."—Iliad, book ii.

Homer availed himself of the popular story concerning the blindness of Thamyris, and embellished it by his verification. Probably the whole allegory of this blindness had its rise from his having injured the organ of sight by too intense an application to the study of music and poetry. And it is the opinion of Pausanias, that there was no other difference between his misfortune and that of Homer, than that Thamyris was wholly silenced by it, and Homer, without being discouraged, continued his poetical and musical occupation long after his blindness.

THAN, in Geography, a town of Hindoostan, in Guzerat; 55 miles N.E. of Junagur.

THANE, or Thain, Thamus, the name of an ancient dignity among the English, or Anglo-Saxons.

Skene makes thane to have been a dignity equal with that of the son of an earl; Camden will have it, that thanes were only dignified by the offices which they bore.

There were two kinds or orders of thanes; the king's thanes, and the ordinary thanes. The first were those who attended our English-Saxon kings in their courts, and who held lands immediately of the king; whence, in Domesday-book, they are promiscuously called thoni, and foreigns rege.

Soon after the Conquest this name was disused; and instead of it, they were called the king's barons, barones regis.

Their origin is referred to king Canatus, who, taking the chief of the Danish nobility, to the number of three thousand, for his guard, and arming them with battle-axes and sabres with gilt handles, called them thing lib, from the two Danish words thing or their, body of nobility, and lib, order of battle.

The ordinary thanes, or thani minoris, were the lords of manors, who had particular jurisdiction within their limits, and over their own tenants.

These changed their name for that of barons; and hence their courts are called courts baron to this day.

In old authors, charters, &c. we also meet with than as signifying
signifying a nobleman; though sometimes only a freeman, and sometimes a magistrate.

THANKLAND, were lands granted by charter of the Saxon kings to their thanes.

THANET, Isle of, in Geography, is a tract of land on the southern coast of the county of Kent, England, consisting of about 27,000 acres, and is separated from the remaining part of the county by the narrow channel of the river Stour, and the smaller stream called the Nethergong. The marshes which border these streams are extensive, and afford rich pasturage for cattle, but the higher grounds are principally appropriated to the growth of corn. The Isle is in shape a long oval, being about nine miles in length from east to west, and nearly five miles broad from north to south. Solinus, who is quoted by Camden, calls it Athianatos, and in some copies Thanatos, which probably gave origin to the Saxon appellation Tenet, or Tanelond; though Lewis derives this from Tene, a fire or beacon; and he supposes the Isle to have been so named on account of the beacons or fires which were kept here to give notice of Danish or other pirates, to whose ravages it was greatly exposed. Thanet is bounded on the north and east sides by the sea; a circumstance which, connected with the salubrity of its air, and its convenient distance from the metropolis, has led to the establishment of several watering-places; and these, in the summer and autumnal seascapes, occasion a continual influx of visitants, whose expenditure adds greatly to the wealth of the fixed inhabitants. The chalk cliffs which surround the coast abound in fossils; and among them, the cornua ammonis has been found, measuring upwards of three feet in diameter. The whole of Thanet is divided into the two capital manors of Minster and Monkton, by St. Mildred's Lynch, a narrow strip of land, left unploughed, and extending quite across the Isle, from Westgate by Woodchurch, to Sheriff's Hope near Monkton. The Isle anciently contained eleven parishes; but those of Sarre and All Saints have been united to St. Nicholas, and that of Woodchurch to Birchington. The parishes of Minster, Monkton, and Stonor, with parts of those of St. Nicholas and St. Lawrence, are under the jurisdiction of two courts; the other parishes, namely St. John's, including the town of Margate; Birchington, with Gore's End, St. Peter's, and Wood or Woodchurch, the ville of Ramsgate, and the ville of Sarre, with the remainder of St. Nicholas and St. Lawrence, are all members of, and subject to the control of the ports of Dover and Sandwich. The population return of the year 1811 stated the inhabitants of the Isle to be 16,156; the number of houses 3,299. (See Margin, Ramsgate, and Reculver.)—Beauties of England and Wales, vol. xiii. Kent; by E. W. Brayley.

THANN, or DANN, a town of France, in the department of the Upper Rhine; 15 miles N.E. of Belfort.

THANN, See Tanna.

THANNHAUSEN, or TANNHAUSEN, a town of Germany, in the circle of Swabia, and principal place of a lordship of the same name, on the river Mindel; 14 miles N. of Mindelheim.

THANNURIS, in Ancient Geography, a town of Asia, in Ophroene; and another in Mesopotamia.

THANTIA, a town of Palestine, in Batansea, eastward towards the mountains, S.E. of Adraa.

THANWALD, in Geography, a town of Sile sia, in the principality of Brandenburg; 13 miles N.W. of Breslau.

THAOUAOUIS. See TAVAVIS.

THAPAU, in Ancient Geography, a town situated in the interior of Arabia Felix. Ptol. Vol. XXXV.

THAPSA, a town of Palestine, in the tribe of Ephraim.

THAPSACUS, or AMPHIPOLIS, a large and flourishing town of Asia, in Syria, on the banks of the Euphrates. When Alexander, after leaving Egypt, came to Thapsacus, he found there two bridges over the Euphrates. Xenophon tells us that Cyrus is founnded here five days; and that it was here that he informed the Greeks of his intention to march to Babylon. The soldiers mutinied, but were afterwards appeased by his promises. Thapsacus is now a village, called "El-Der." The channel of the river is here about half a mile in breadth, and would appear to have been fordable from the earliest times to the present day. It was passed on foot by Cyrus and his whole army, and, as some say, by that of Alexander the Great.

THAPSA, in Botany, a name adopted from the ancient Greeks, which 6?k<, 6, if not precisely a species of our present genus, was certainly, like it, a large umbelliferous plant, yielding a gummy exudation, and bearing yellow flowers, succeeded by broad seeds. Such is the description given by Dioscorides, who moreover adds, that his 6k<, tio named from the island of Thapsos, where it grew, was in every respect like Pardela; but with a more slender stem, and leaves nearly akin to fennel. The root was large; white within, black on the outside, with a thick acid bark. It attributes various virtues to its gum or juice, either taken as a purge, or in preparations of the shell; or applied externally, along with honey, wax, or frankincense, for cutaneous complaints, tumours, &c.—Linn. Gen. 144. Schreib. 193. Wildl. Sp. Pl. v. 1. 1404. Mart. Mill. Dict. v. 4. Ait. Hort. Kew. v. 2. 156. Sm. Prod. Fl. Græc. Sibth. v. 1. 201. Juss. 220. Tourn. t. 171. Lamiacec. Illurst. t. 206. Gartn. t. 21. —Clais and order, Pentandria Digyna. Nat. Ord. Umbellata, Linn. Umbelliferae, Juss. Gen. Ch. General Umbel large, with about twenty rays, of nearly equal length; partial of as many, nearly equal, rays. Involucrum none, neither general nor partial. Periamb scarcely discernible. Gen. Universal uniform; all the flowers fertile; partial of five lanceolate incurved petal. Stam. Filaments five, capillary, the length of the corolla; anthers simple. Pist. Germin inferior, oblong; &bys two, short; stigma obtuse. Peric. Fruit oblong, enwrapped longitudinally with a membranous border, separable into two parts. Seeds two, very large, oblong, convex, pointed at each end, enwrapped at each side with a large, flat, entire-edged border, which is emarginate at each extremity.


r. Th. villofa. Villous Deadly Carrot. Linn. Sp. Pl. 375. Wildl. n. 1. Ait. n. 1. (Th. prima; Clus. Hist. v. 2. 192. Th. latifolia Chufi; Ger. Lin. 1930.)—All leaves toothed, villous; confluent at the base.—Native of flouy ground, in Spain, Portugal, and the south of France. Dr. Sibthorp found it in the fields of Patmos and Cyprus, and Dr. Broussonet at Algiers. The root is perennial, tap-shaped, fald to be of an extremely foetid, acrid, and nauseous quality, which has given rife to the English name. Gerarde applies to this species what Dioscorides says of T. garranica, that exhalations from the root or plant exaluter the skin. The floem is three or four feet high, erect, round, smooth, leafy, branched at the top. Leaves large and spreading, two or three times pinnate; their leaflets sessile, obtuse, pinnatifid, notched, confluent at the base, in the manner of a fern; hairy on both sides; whitish and downy at the back. Umbels several, stalked, terminal, large, smooth, naked. Flowers yellow, rather small. Fruit about half an inch long, and a quarter broad, with four ribs at 3 L each.
each side, and a thin, brown, membranous double wing at each margin.

2. *Th. fsetida.* Stinking Deadly Carrot. Linn. Sp. Pl. 375. Willd. n. 2. Ait. n. 2. (Th. vulgaris; Ger. Em. 1031. Th. vulgaris, carota efficie; Lob. 1c. 780. Morif. sect. 9. t. 18. f. 7.)—Leaflets many-eleft, acute; contracted at the base.—Native of Spain, as well as of Zante and Cyprus. Gerarde had this plant in his garden, and it is still, like the foregoing, to be seen in curious botanical collections, though not very commonly. It differs from the *silofo* in having more finely, acutely, and deeply divided leaflets, which are wedge-shaped, not dilated at the base. The fize of the whole plant is smaller, and the stem more branched.

3. *Th. Afcelpium.* Fine-leaved Deadly Carrot. Linn. Sp. Pl. 375. Willd. n. 3. Sm. Fl. Gracc Sibth. t. 286, unpubl. (Th. apula, folis millefoli; Morif. sect. 9. t. 18. f. 9.)—Leaflets deeply pinnatifid, with long, green, glaucous, smootarters, to be seen in curious botanical collections, though not very commonly. The *silofo* in having more finely, acutely, and deeply divided leaflets, which are wedge-shaped, not dilated at the base. The whole plant is smaller, and the stem more branched.

4. *T. gar*ganica. Garganian, or rather Greek, Deadly-Carrot. Linn. Mant. 57. Willd. n. 4. Ait. n. 3. Gonan Illustr. 18. t. 10. Sm. Fl. Gracc Sibth. t. 287, unpubl. (Th. thalictii folio; Magn. Monsp. 287. t. 286. Th. fife Turbich gargasiecum, femine latifimo; Bauh. Hift. v. 3. p. 2. 50.)—Leaves radiato-pinnate; leaflets deeply pinnatifid, with linear decurrent segments. Native of Barbary, the south of Italy, and the Levant. Dr. Sibthorpe finding it very common throughout Greece, and the neighbouring islands, juftly concluded this species to be the true *silofo* of Dioscorides, with whose description it agrees better than any of the reft. It is a stately perennial plant, whose seeds were probably obtained from the garden of Montpellier, by our British cultivators, towards the year 1688. The firm round leafy stem, as well as the sheathing bases of the footstalks, and the ripening seeds, are tinged with a fine glaucous purple. Leaves long, green, smooth above; glaucous, and sometimes hairy, below; their segments near an inch long, linear, entire. Common footstalks long, round, sometimes very hairy. Umbels very large, yellow. Petals lanceolate, involute. Fruit an inch long, with broad, thinning, brown wings; its fides finely ruffled. For *Tb. trifolata,* Linn. Sp. Pl. 376, see *Smyrnium* t. 6, cardorum. *Th. polygamy,* Desfont. Atlant. v. 1. 261. t. 75. Mart. Mill. Dict. n. 6, found on the sea-coafl of Barbary, cannot belong to this genus, having a general, as well as partial, involucrum, and abortive central flowers. It should fcam to be a Laverperpusum. See that article.

**THAPSIS,** in *Ancient Geography,* a river of Scythia, in the environs of the Palus Mecotides, according to Dioscorus Siculus.

**THAPSOS,** in the *Materia Medica of the Ancients,* a name given to a kind of wood of a pale yellow colour, used of old in dyeing of linen and woollen cloths. The Greek *thapsos* signifies a pale dead yellow colour, and is applicable either to the substance, or the juice or tincture of all these.

The people of Crete at this time ufe the lygium-wood in dyeing a yellow colour, and it is probable that the *thapsos* was this very tree. Dioscorides tells us, that the wood of this tree was also ufed in his time to tinge the hair yellow, which was a favourite colour with the Greeks. The lygium is of a colour somewhat deeper than our box-wood, and parts with its fain so easily, that it fems very proper for such a purpofe.

**THAPSUM,** among the old Roman Writers, a common name for the verbascum, or mullein; but as there were many other plants, very different in their nature, yet whole names refemblcd this; fuch as the *thapsos,* or deadly carot, and the *thapsos* or geniftella tinctoria; it was foon found neceffary to add some other name, and it was then callcd *thapsos* barbatum, or barbafum.

The reafon of the geniftella being called *thapsos,* was, that its flowers were yellow, and were ufed to colour the ladies’ hair; that being the favourite colour of thofe days. The flowers of mullein are yellow, and seem more fit for the colouring of the hair than thofe of the geniftella; their colour being more easily feparated, and continuing on fo well, that the gloves of many parts of England ufe them in the feafon for colouring their yellow gloves.

It is probable, that the ladies of old ufed this, as well as the geniftella, for this purpofe: and it might hence obtain the common name *thapsos.* The other part of its dilinition, *barbatum,* seems owing to the leaves being fo coloured with a woofly down that they look bearded. And when this word is written *barbafum,* it may probably be given as the name of fome of thofe species of mullein which are not hairy, as our black or fage-leaved mullein, and be a corruption of the word *verbascum.* This black mullein has no lefs title than the white or bearded kind to the name *thapsos;* its flowers being of a yet finer yellow than thofe of that kind, and being as fit for the use of flaining. The gloves in fome places ufe this species for their leather-gloves.

**THAPSUM, DEMASS,** in *Ancient Geography,* a maritime town of Africa, upon a tongue of low land, S. of the Leffer Leptis. The place abounds with ruins.

**THAPSUM, or Tapsis,** in *Botany,* see *Verbascum.* This name feme to have originated with Gerarde, who gives no explanation, nor do we find any authority for the opinion of De Theis, that it alludes to the ifle of Thapsos, as the native country of the plant. Such indeed is the acknowledged derivation of *Thapsia,* fee that article; with which this *Verbascum,* a *verbos,* of the Greeks, has no relationfhip whatever.

**THAR,** in *Ancient Geography,* a town of Arabia Felix, belonging to the people called Themi.

**THARAND,** in *Geography,* a town of Germany, in the circle of Upper Saxony, and circle of Erzgebirg; 10 miles E.N.E. of Freyburg.

**THARE,** in *Ancient Geography,* a place of the encampment of the Iphracites, whence they went to Methea. (Numb. xxxii. 27.) Thare, situated in Arabia Deferta, was the 24th iflation of the Iphracites.

**THARELA,** a town of Palestine, in the tribe of Benjamin.

**THARGELIA,** in *Antiquity,* an Athenian festival in honour of the fun, and his attendants, the
TH A

Hours: or, as others think, of the Delian Apollo and Diana. For an account of the ceremonies of this solemnity, see Potter Archeol. Graec. lib. ii. cap. 26. tom. i. p. 420. seq.

THARGELION, in Chronology, the eleventh month of the Athenian year. It contained thirty days, and answered to the latter part of our April, and the beginning of May.

It took its name from the festival Thargelia, kept in it.

THARNAU, in Geography, a town of Silecia, in the principality of Neiff; 1 mile N. of Grotkau.

THARO, in Ancient Geography, an island, situated, according to Ptolemy, in the Perisan gulf.

THARPA, a town of India, beyond the Ganges, in the Golden Chersonesus. Ptolemy.

THARRANA, a town of India, beyond the Ganges, on the coast of the Great gulf. Ptol.

THARSIA, a town of Africa propria, or one of those which Ptolemy points out between Bagradas and the town of Thabraca.

THARSLIS, Tharsis, or Tarshis. See OPHIR.

THASO, in Geography, an island of the Grecian Archipelago, situated in the gulf of Consta, anciently called Ereia, or Æthria, being famous; even to a proverb, for its rich gold mines. It has a town or village of the same name. N. lat. 40° 34'. E. long. 42° 30'.

THASSUS, Thasos, or Thasus, in Ancient Geography, an island situated on the coast of Thrace, opposite to the mouth of the river Neftus. Thasus, son of Agenor, king of the Phoenicians, is said to have remained many years in this island; to have peopled it, and to have given it his name. It was afterwards increaced by a Greek colony. The Athenians made themselves masters of this island, and treated the inhabitants with great rigour; but they were expelled by the Macedonians, and these again by the Romans.

THATCH, in Rural Economy, prepared straw which is intended to be laid on the top of a building, rick, &c. to keep out the wet. There are many different sorts of materials that may be made use of as thatch, but those which are most commonly employed are the straw of different sorts of grain, as wheat, rye, &c. reed, fluttle, heather, &c. The straw of wheat and rye, when well prepared and laid, probably forms the neatest and most secure covering for general purposes. It has indeed been stated, that the most suitable material for the purpose is that of good wheat-straw that has been much bruised in threshing out the grain. But when this cannot be had in sufficient quantity, rye-straw may be substitutted in its place; however, from its rough and flabbish quality, it is neither so neat in its appearance, so durable, nor affords so secure a covering. And that barley and oat straw are sometimes made use of for the purpose, but they form very indifferent coverings, and such as are not by any means lasting. The former, when strong, is however preferable to the latter.

The reed is a highly valuable article for the purpose of thatch, where a leaking roof is required; but is much too expensive and flabbish for common purposes. It has been remarked by Mr. Marshall, in the Rural Economy of Norfolk, that there, the favourite material for roofs, and that which is the most eligible after good flax for farm purposes, is reed. And that a reed roof properly laid, will lie fifty years without touching; and thirty or forty more, with only adjufling (driving) it, and levelling the hollows with a little fresh reed. At an hundred years old it may be relaid; and will then, if laid upon the upper parts of the roof, last through a considerable part of another century. The reed is, he says, principally cut from the margins of the bords, (large pieces of water,) and is carried, perhaps forty or fifty miles into the central and northern parts of the county. And it is added, that though a covering of reed is, in the first instance, costly; when its durability, and the high degree of preservation in which it keeps the roof, are taken into the account, it is of all other the cheapest covering; besides its being, whether in the extreme of heat or cold, the most comfortable.

And it is stated, that the price of reed, in the place of its growth, is from three pounds to three guineas a hundred, containing six score fathoms; each fathom composed of five or six sheaves measuring six feet in circumference. A hundred of reed will cover five squares of roof: the laying is a halfpenny a yard, or four shillings and twopence a square; and the tar rope and rods for fastening it on cost eighteen pence a square; so that a covering of new reed costs about eighteen shillings a square, containing two square feet; besides carriage, and what is called roofings; namely, a cap of wheat-straw placed upon the ridge, in a somewhat similler manner, and for the same purpose, as ridge-tiles are put on. This capping, which is done in a most effectual, but in a tedious and expensive manner, coils, in materials and workmanship, about sixteen pence each foot in length: which, upon a roof of sixteen feet and a half spar, is an additional expense of four shillings each square of reeding.

With regard to the carriage, it is in proportion to the distance. Taking twenty miles as a medium distance, and one shilling a mile as a medium price; the expense is, he says, twenty shillings a 'load' of fifty fathoms, or forty shillings a hundred; which laying five squares is a further addition of eight shillings a square: therefore, the whole expense of a covering of reed fetched twenty miles, may, he supposes, be laid at thirty shillings a square. The writer has been thus minute, he says, in his account of this material, as it has been much overlooked in other districts, where it may be found useful.

This material is a great deal more expensive in every respect which has any relation to this object, at the present time, than it was then.

And with respect to the fluttle, it is said to be a material that may be made use of with propriety and advantage in some situations. This is the fluttle of fitch wheat or other crops as have been cut at a great height; which, after being mown close to the ground and raked up, serves this purpose, especially for the more common purposes of the farm, such as covering hay and straw flacks, &c. the thatching potatoes when hogged in the ground, and many other such cases.

The half material, heather, is also found a highly valuable article for the purpose of thatch in districts where it grows in abundance, as it is extremely durable. See Heather.

The thatch which is removed from the flacks or buildings may be used as a litter for various purposes.

The modes of preparing and applying these different matters to the roofs of flacks and buildings will be pointed out in speaking of the operation of securing fitch roofs by means of fitch fluttances. See Thatching.

Where straw of the rye or wheat kind is very strong, it is often termed reed or straw reed by the thatcher, and used for covering large hay-flacks very commonly in many districts.

THATCHAM, in Geography, a village and parish in the hundred of Reading and county of Berks, England, is situated 3 miles E. from Newbury, and 53 miles W. from London. It appears to have been formerly a town of some consequence, from the Domesday Survey, and other records.
cord, in which it is described as an ancient borough; but it does not appear ever to have sent representatives to parliament.

From a very early period it had a market on Sundays, which was confirmed to the abbey and convent of Reading by a charter of Henry II. The market-day was changed by Henry III. in 1218 to Thursday; but the market has long been discontinued. Two annual fairs are still held. The manor of Thatcham was given to the abbey and convent of Reading by Henry I. At the dissolution it was granted, in 1539, to John Winchcombe, son of the celebrated Jack of Newbury; it is now the property of William Mount, esq., of Waling. A charity-school was founded here, in 1707, by lady Frances Winchcombe, who endowed it with 53l. per annum. The school has been long discontinued, and its revenue lost to the parish; when Mr. Thompson, a late vicar, instituted a suit for their recovery, and after a long contest succeeded in the re-establishment of the school, with an income for the matter increased to 200l. per annum; forty boys are now clothed and educated, and six of them annually apprenticed with premiums of 10l. each. The parish of Thatcham is the most extensive of any in the county, excepting Lamborn, and includes six townships. The population, according to the parliamentary report of the year 1811, was estimated at 2104; the number of houses at 424. — Lysons's "Magna Britannia," vol. i. Berkshire.

THATCHER, a rock in the English Channel, on the north side of Torbay.

THATCHING, the operation of covering the roofs of buildings, stacks, and other things, with some fort of thatch. For this purpose, articles of the straw kind are prepared in the following manner: After being well moistened with water, they are drawn out in handfuls perfectly straight and even into regular lengths, and the short straw separated from them, leaving them placed in convenient ranges for forming bundles to be carried to the thatcher by the performer who has the sifting of them.

In regard to the application of the thatch to stacks of hay or corn, there are different methods pursued, according to the nature of the materials employed. Where long straw is made ufe of, the operator or workman usually begins at the eaves or bottom part of the roof, depositing it in handfuls in regular breadth till he reaches the top, the different handfuls being fo placed endways as to overlap each other, the upper ends being constantly pulled a little into the bottom parts of the sheaves or other matters. In this manner he gradually proceeds, breadth after breadth, till the whole of the roof is covered, which is ufually done to the thickness of about four or five inches. And in order to retain the thatch in its place, short sharpened sticks, termed prods in some places, are occasionally thrust in, in a flanting direction upwards; and sometimes small sticks, often called fields, sharpened at the ends, are bent and thrust in along the top parts and fides. But as the water is apt to follow the course of the ficks, it is perhaps a better practice to make ufe of ropes of twisted straw for this purpose. In some cafes, these are applied only round the bottom parts of the roof and the fides; while in others, which is a much better and more secure method, they are applied in such a manner over the whole stacks, as to form a fort of coarse net-work of nine or twelve inches in width in the niches, the ends being well fastened either to belt-wraps padded in fuitable directions for the purpose, or to different parts of the straw of the stack.

After being prepared, put on by flicking one of its ends into the roof of the stack in a regular and exact manner, so as that it may stand out very close and thick; when the other, with such loose straw as may occur, is to be cut over or pared off, with a very sharp tool for the purpose, so as to form a neat and impenetrable thatch, having the appearance of a newly thatched house roof; the whole being well secured in its place by short pegs made for the purpose, somewhat in the same way as in the thatch of other stacks.

In the thatching of the roofs of houses or other buildings with any of the different sorts of straw, the materials are to be laid on to a considerable thicknefs, and firmly secured. They are applied in regular narrow frips, or what in some districts are termed gauze, from the eaves of the building to the ridges, the ladder being moved forward as the work proceeds. The thatch is secured by short sharpened ficks, as above, or by сдела or where necessary. And bended ficks, sharpened at each end, are likewise sometimes made ufe of near the ridges, being thrust in at each end. In finifhing the work, the thatcher moftly employs an iron-toothed rake, with which the whole is raked and trimmed over from top to bottom, so as to render it completely smooth and even, and take away all the short straw, and other irregular matters.

The method of thatching with reed, according to Mr. Marshall, in his account of the Rural Economy of Norfolk, is this: no lafts being made ufe of, in laying it, a little of the longest and stoutest of the reed is scattered irregularly across the naked fpars, as a foundation to lay the main coat upon: this partial gauze-like covering is called the "flaking." On this flaking the main covering is laid, and fastened down to the fpars by means of long rods, proportionally "sways," laid across the middle of the reed, and tied to the fpars with rope-yarn, or with "bramble bonds," formerly much ufed, but now nearly laid aside. In laying on the reed, the workman begins at the lower corner of the roof, on his right hand, for instance, and keeps an irregular diagonal line, or face, until he reaches the upper corner to his left, a narrow eaves-board being nailed across the feet of the fpars, and some flaking flattered on; the thatcher begins to "set his eaves," by laying a coat of reed, eight or ten inches thick, with the heads refting upon the flaking, and the butts upon the eaves-board. He then lays on his swa (a rod about the fize of a small edder) about fix or eight inches from the lower point of the reed; whilst his affilant, on the infide, runs a needle, threaded with rope-yarn, close to the fpar; and, in this cafe, close to the upper edge of the eaves-board. The thatcher draws it through on one side of the fway, and enters it again on the contrary side, both of the fway and of the fpar: the affilant draws it through, unthreads it, and with the two ends of the yarn makes a knot round the fpar; whereby drawing the fway, and consequently the reed, tight down to the roof: whilst the thatcher above, beating the fway and pressing it down, affilts in making the work the firmer. The affilant having made good the knot below, he proceeds with another length of thread to the next fpar, and so on, till the fway be bound down the whole length; namely, eight or ten feet. This being done, another ferment of reed is laid on upon the firth, so as to make the entire coat eighteen or twenty inches thick at the butts, and another fway laid along, and bound down, about twelve inches above the firth.

The eaves being thus completely fet, they are adjusted and formed, not square with the fpars, but nearly horizontal: nor are they formed by cutting, but by "driving" them with a "logget," a tool made of a board eight or nine inches square, with a handle two feet long, fixed upon the back of it.
it, obliquely, in the manner of the tool used by gardeners in
beating turf. The face of the legget is set with large-headed
nails, to render it rough, and make it lay hold of the
butts of the reeds. Then another layer of reed is laid on,
and bound down by another sly, somewhat shorter than
the last, and placed eighteen or twenty inches above it; and
above this another, and another, continuing to shorten the
slys, until they be brought off to nothing, and a triangular
corner of thatching formed. After this the slys are used
their whole length, whatever it happens to be, until the
workman arrives at the finishing corner.

In order to give a finish to the ridge, a cap (provincially a
"roof") of straw is set on in a matterly, but in an expensive
manner. In this operation, the workman begins, it is ob-
served, by bringing the roof to an angle, with straw laid the
long way upon the ridge, in the manner in which a rick is
to be put up; and to render it firm, to keep it in its place, and
to prevent the wind from blowing it off, or ruffling it, he pegs
it down lightly with "double broaches," namely, cleft twigs,
two feet long, and as thick as the finger, sharpened at both
cents, bent double, and perhaps with the twirling of the
wood, and perhaps barbed, by partial chops on the sides, to
make them hold in the better. This done, the workman
lays a coat of straight straw, six or eight inches thick, across
the ridge; beginning, on either side, at the uppermost butts
of the reed, and muffling with straight handfuls evenly across
the top of the ridge. Having laid a length of about four
feet in this manner, he proceeds to fasten it firmly down, so
as to render it proof against wind and rain. This is done by
laying a "'trowen ligger" (a quarter-cleft rod as thick as the
finger, and four feet in length) along the middle of the
ridge, pegging it down at every four inches with a double
broach, which is first thrust down with the hands, and after-
wards driven with the legget, or with a mallet used for this
purpose. The middle ligger being firmly laid, the thatcher
smooths down the straw with a rake and his hands, about
eight or nine inches on one side, and at six inches from the
first lays another ligger, and pegs it down with a similar
number of double broaches, thus proceeding to smooth the
straw, and to fallen on liggers at every six inches, until he
reach the bottom of the cap. One side finished, the other
is treated in the same manner; and the first length being
completed, another and another length is laid, and finished
as the first, until the other end of the ridge be reached. He
then cuts off the tails of the straw square and neatly with a
pair of shears, level with the uppermost butts of the reed;
above which the cap (or most properly the roofed) flows an
eaves of about six inches thick. And lastly, he sweeps the
eaves of the main roof with a bow of holly, when the work
is completed. This, when well performed, must be a
durable and useful mode of thatching; and at the same time
one which has a neat appearance.

In thatching with heather, that material mostly under-
goes some sort of preparation, so as to render it as equal as
possible in size and strength, being laid and fastened upon the
roofs then in somewhat the same manner as that of straw.
It is afterwards swept, cleaned, and finished off in a neat and
exact manner, so as to look extremely well.

In some of the more exposed situations in the northern
parts of the island, they have other modes and practices of
thatching buildings with straw in use, such as performing it
with clay, or thin turf and that material.

If the roof be covered with thin turf or divots, the work-
man is to twist the upper part of the straw into a sort of
knot; then, with a flick prepared for the purpose, to force
the knot thus formed either under or through the turves or
divots, so that it may have a firm hold of the roof; after
which, to spread the lower part of the bundle of straw nicely
on the roof, continuing to do the same to the very top
of the roof; and then to clay it all over, and begin an-
other tier, gang, or row of the thatch. In this way, the
thatch should not be laid thinner than six inches, and when
it is laid eight inches thick, it is the more durable. Thin
turf, or divots, were originally thought the best foundation;
but it has been since found by experience, that they rot the
straw, and that straw alone, when wretched on with rope-yarn,
lasts much longer. If straw alone be used in this manner, it
will last twenty years, but the straw must be laid on two inches
thicker than when clay is added. A roof that is thatched
with divots, straw, and clay, in the common way, will last
from seventeen to twenty years; and is also capable of being
mended without raising any part of the roof that is entire.
The above kind of roof is much less liable to catch fire than
straw roofs without clay. The clay that answers the pur-
pose best is that which has a due proportion of sand in it.
If stiff clay should be used, it will be necessary to add one
cart-load of sand to every two of the clay.

This sort of claying may, of course, be useful and advan-
tageous in thatching the roofs of buildings in many situa-
tions and places.

THAU, in Geography, a lake of France, in the depart-
ment of the Herault, near the Mediterranean, between
Frontignan and Agde.

THAANA, in Ancient Geography, a town situated in
the interior of Arabia Felix.

THAUBA, a town in the interior of Arabia Felix.

THAUGHTS, or Thoughts, in a Beat, are the
berches on which the rowers set to row.

THAUMASISUS Mows, in Ancient Geography, a
mountain of Arcadia, N.W. of Mantinea, above the river
Molopus.

THAUMATURGUS, formed from θαυμάζω, wonderful
thing, and θαυμάζω, worker of miracles; an appellation
which the Romanists gave to several of their saints, eminent
for the number and greatness of their miracles.

St. Gregory, called Thaumaturgus, or Gregory of Neo-
caearea, was a disciple of Origen about the year 223, and
afterwards bishop of Caesarea, in Pontus; and in that cap-
acity he abiled at the first council of Antioch, and at that of
Ephesus, against Paulus Samosatenus. St. Leo of Ca-
tanea is also called Leo Thaumaturgus. He lived in the eighth
century; and his body is still honoured at Rome, in the
church of St. Martin de Tours. St. Francis Paul, and
St. Francis Xavier, are the great Thaumaturgi of these later
ages.

THAWING, the resolution of ice into its former fluid
state, by the warmth of the air.

THAXTED, in Geography, an ancient market-town in
the hundred of Dunmow, and county of Essex, England,
is situated 19 miles N.N.W. from Chelmsford, and 43 miles
N.N.E. from London. The town was known in the Saxon
times, as the church is recorded to have belonged, in the
reign of Edward the Confessor, to the college of St. John
Baptist, at Clare, in Suffolk. Thaxted was incorporated
by charter of Philip and Mary, which was confirmed by
queen Elizabeth; under this the civil government is vested
in a mayor, recorder, two bailiffs, and twenty principal
burgesses. In the reign of James II. the corporation ex-
perienced a temporary lufpension; for being served with a
writ of quo warranto, the corporate officers, either through
fear or poverty, thought fit to retire from their offices.
The market was granted by Edward II., but was discon-
tinued for a long period; it has been recently revived, and
is now held on Fridays. Here are also two annual fairs. In the population return of the year 1811, Thaxted was flated to contain 390 houses, occupied by 1733 persons. The church is a very large and beautiful structure, and appears, from the various arms and cognizances on several parts, to have been built at different times in the fourteenth and fifteenth centuries. The whole fabric is embattled, and supported by strong buttresses, terminated by canopied niches, and curiously purfled pinnacles. At the west end is an embattled tower, buttained by buttresses, and surmounted by a neat octagonal spire, rising to the height of 181 feet. The interior consists of a nave, transept, chancel, and side aisles: the arches of the nave are pointed, and supported by eight clustered columns on each side. The expense of the erection of this church was principally defrayed by the noble families of Clare and Mortimer, who then posfessed the manor, with some affiance from king Edward IV. A chantry, besides various chapels and altars, were ufed here before the reformation. The charitable benefactions for the use of the poor inhabitants of Thaxted are confiderable. An estate, called Yendeleys, deriving its name from Thomas Yendale (who refided on it temp. Henry VI.), was, on his death, veiled in trufi for his four sons and their ifuic; and in default of such issue, to be fold for the benefit of the church and poor. The sons dying childfeles, the eftate was fold 5 Henry VII. and the produce is applied to the support of a school, repairing the church, improving the highways, &c. In 1698, William, lord Maynard, bequeathed 4000l. in trufi, the produce to be applied for increafing the minister's falary, repairing the church, marrying poor young women, binding out apprentices, and relieving poor people overburthened with children. Among other benefactions are endowments for alms-houses in several parts of the town: one of the buildings appropriated for that purpose is the old chantry-houfe. The ancient guildhall is now the parish workhouse: the mote-hall is ufed for a public school.


THERE, in Ancient Geography, a town of the Pelopomneus, in Laconia.

THERE, in Botany, the Tea-tree, a name of barbarous derivation, originating in the Chinefe Tha, or Japaneffe Tja, of which the various nations of Europe have made, according to their fancy, Chaa, Tea, Thé, &c. and which Kempfer has formed in Latin into Thisa. This laft has been admitted by Linnaeus, for the fake of its Greek orthography, exactly that of θς, a goddess, a coincidence highly welcome to thofe who honour the cordial beverage of tea as it deferves.—

have been greatly at a loss for a specific name, and have adopted *viridis* to avoid any needles change, thinking it rather preferable to *Bohea*, which is a partial name, and of corrupt orthography. Dr. Sims, in *Curt. Mag.*, has used *chinensis*, but this is liable to objection, as the name of a country to which the plant is not quite peculiar; and Loureiro's *cautonensis* is therefore still more exceptional. This last author concurs in the opinion that all the common Chinese teas belong to one species. He describes indeed two others, *T. cochinchenensis*, which leaves a trifling variety of the above; and *T. oleifera*, growing wild near Canton, said to bear a yellow berry, whose seeds supply the Chinese with lamp-oil.

**Thea**, in *Gardening*, furnishes plants of the exotic shrubby kind, the species of which chiefly in use is the tea-tree (*Thea*).

This tree, as it is commonly described, differs in height, in its native climate, from five to six feet to thirty, and even one hundred and fifty, or more, when let grow to its full size and dimensions.

And in respect to the varieties of it, Martyn has considered them all as forming one species, in which he is, he affirms, supported by the best authorities. Kämpfer, he contends, attributes their difference to soil, culture, age of the leaves, and method of curing them. Mr. Ellis also directly affirms, that the green and bohea tea are one and the same species; and that it is the nature of the soil, the culture, and manner of gathering and drying the leaves, that make the difference. So also Sir George Staunton maintains, that every information received concerning the tea plant concurred in affirming, that its qualities depended upon the foil in which it grew, and the age at which the leaves were plucked off the tree, as well as upon the management of them afterwards. See *Tea* and *Thea*.

The bohea tea-trees now introduced into many botanic gardens near London, exhibit very obvious varieties: the leaves are of a deeper green colour, and not so deeply ferrated; and the stalk is usually of a darker colour: but the botanical characters are the same. Thunberg also distinguishes two varieties from the leaves, which in one are smaller, flat, darker green, with straight ferratures, and in the other larger, waved, brighter green, with obtuse ferratures: but they can scarcely be considered as distinct species. Loureiro observed little difference in the fou-chong which he examined; both these have a brown colour, but are more odoriferous and precious than the common bohea of the province Foo-kien, which he had not an opportunity of seeing in a living state, though it is the most common and cheapest of all. He examined the dry flowers of the green-tea from the province of Kiang-su, and observed the same inconstancy as to the number of parts in the calyx and corolla, as in the bohea. Upon the whole, he concludes that all the differences of Chinese tea form only one botanical species, owing their variation to soil, culture, and method of preparation; all retaining the same inconstancy in the parts of the flower, which gave occasion to Linnaeus to consider them as two species. Besides, it is evident that many varieties of tea are known in China, which arise from mixture and management.

The distinctions chiefly regarded in Europe are the following.

**Green Tea.**—1. *Bing*, imperial or bloom tea, with a large loose leaf, of a light green colour, and a faint delicate smell.

2. *Hy-tiann*, hikong, hayfwen or heechun, known to us by the name of hyson tea: the leaves are closely curled and small, of a green colour verging towards blue. Another hyson tea, with narrow short leaves, is called hyson-utchen. There is also a green tea named globe, with long narrow leaves.

3. Song-lo or singlo, which name it receives, like several others, from the place where it is cultivated.

**Bohea Tea.**—1. *Soo-chuen*, fut-chong, fon-chong, or fut-chong, called by the Chinese faa-tyang, and faet-chon or fy-tyann, is a superior kind of cong-fou tea. It imparts a yellowish-green colour by infusion, and has its name from a place or province in China. Padre futchong has a finer taste and smell: the leaves are large and yellowish, not rolled up, and packed in papers of half a pound each. It is generally conveyed by caravans into Russia: without much care it will be injured at sea. It is rarely to be met with in England.

2. *Cam-ho* or fourm-lo, called after the name of the place where it is gathered: a fragrant tea with a violet smell; its infusion is pale.

3. *Cong-fou, congfo*, or *pong-fou*: this has a larger leaf than the following, and the infusion is a little deeper coloured. It resembles the common bohea in the colour of the leaf.

There is also a sort called *lin-kifan*, with narrow rough leaves. It is seldom used alone, but mixed with other kinds. By adding it to congfo, the Chinese sometimes make a kind of pekoe tea.

4. *Pekao, pecko*, or pekoe, by the Chinese called back-lo or pack-lo: it is known by having the appearance of small white flowers intermixed with it.

5. *Common bohea or black tea*, called *moji* or mo-ee, by the Chinese, consists of leaves of one colour. The best is named *Taak-yoom*. An inferior kind is called *An-kei*, from a place of that name. In the district of Honam, near Canton, the tea is very coarse, the leaves yellow or brownish, and the taste the leaf agreeable of any. By the Chinese it is named *honam-te*, or *kuli-te*.

But besides these, tea, both bohea and green, is sometimes imported in balls, from two ounces to the fize of a nutmeg and of peas. The Chinese call it *pome-ul-tea*. The smallest in this form is well known under the name of gunpowder tea.

And sometimes the succulent leaves are twisted like packthread, an inch and a half, or two inches long; three of these are usually tied together at the ends by different coloured silk threads. Both green and bohea teas are prepared in this manner.

The manner of gathering and preparing the leaves, as practised in Japan, according to Kämpfer, as far as our information reaches, is in a great measure conformable to the method used by the Chinese. See *Tea*.

Whether the Chinese collect the tea precisely at the same seasons as in Japan, we are not well informed; but most probably the tea harvest is nearly at the same periods, the natives having frequent intercourse, and their commercial concerns with each other being very extensive.

For an account of the preparation of the tea-leaves, &c. see *Tea*.

The country people cure their tea-leaves in earthen kettles, which answer every necessary purpose, at least trouble and expense than by the processes described under the article *Tea*, and they are thus enabled to sell them cheaper. After the tea has been kept for some months, it is taken out of the vessels in which it was stored, and dried again over a very gentle fire, that it may be deprived of any humidity which remained, or it might have since contracted.
THE

The common tea is kept in earthen pots with narrow mouths; but the belt forts, used by the emperor and nobility, is put into porcelain or china vessels. The coarselain tea is kept by the country people in straw baskets, made in the shape of barrels, which they place under the roofs of their houses, near the hole that lets out the smoke.

Method of Culture.—Thee plants may be raised in this country by seeds, layers, and cuttings of the young branches. The editor of Miller's Dictionary advises that the seeds should be procured from China, and that care should be taken that they be fresh, sound, ripe, white, plump, and moist internally. After being well dried in the sun, they may be inclosed in bees-wax, or left in their capsules, they may be put into very close canisters of tin or tin tincture. Thouin, in his directions to Peronie, it is said, recommends thee and other seeds to be placed in alternate layers of earth or sand, in tin boxes, closed up exactly, and placed in solid cases, covered with waxed cloth; the boxes to be placed in a part of the ship the least accessible to moisture, and the most sheltered from extreme heat or cold. And Mr. Sneyd, it is added, was very successful in having seeds packed up in absorbent paper, and surrounded by raffia or moilt sugar, which kept them in a snate fit for vegetation. American seeds are frequently brought over, by putting them into a box, not made too close, upon alternate layers of mofs, in such a manner as to admit the seeds to vegetate. This might be tried with the seeds of the tea-tree; and to succeed more certainly, some of the seeds might be strown in pots or boxes, when the vellifer arrives at St. Helena, and after passing the tropic of Cancer, near the latitude of thirty degrees north. But the belt method seems to be, to sow ripe seeds in good light earth in boxes, at leaving Canton, covering them with wire, to prevent rats and other vermin from getting to them; and taking care that the boxes be not exposed to too much air, nor to the spray of the seas. A little fresh or rain-water should be sprinkled over them now and then; and when the seedling plants appear, they should be kept moist and out of the burning sun. If young plants can be procured in China, they may be strown in a growing state in boxes, forty inches long by twenty broad, and as much in depth, having a few holes bored through the bottom. When the trees arrive here, they must be kept in a greenhouse during the winter, and in the open air during the summer; and if they come in a bad condition, it may not be amiss to plunge the pots into which they are transplanted in a gentle hot-bed, or to let them in a tan-pit, to make them strike and shoot more freely. It is further remarked, that though the tea-tree will not at present bear the rigour of our winters in the open air, yet it is not impossible but it may gradually become naturalized to our climate, like the magnoliam, among several other trees and shrubs; especially if it were to be brought from the coldest provinces of China, where it grows, or from the parts of Europe a little to the northward of us, when it has been naturalized there. It is increased freely by cuttings, when managed in the same manner as gardenias; and it also sometimes grows from layers laid down in the autumn or spring.

Some of these plants should be always kept in pots, to be removed under the shelter either of a greenhouse, glass cafe, or deep garden frame, in winter; and others be planted in a dry, well-sheltered, warm, conspicuous part of the shrubbery, to be afforded occasional covering from rigorous frosts.

They afford variety in greenhouse collections, as well as in the shrubbery.

Although in this country, plants of this kind are only cultivated for the purpose of curiosity, variety, and diversity among greenhouse and other collections, in small quantities; in China, where they are natives, they are raised in vast abundance in plantations of very great extent for their leaves, which form a very great and valuable article of merchandise to that country for the supply of England and the other parts of Europe, they being employed, in their different prepared states, for the making of an infusion with boiling water, which is called tea, and which is very generally in use, especially in this and some other countries. For other particulars, see TEA.

THEAK, in Rural Economy, a word provincially used to signify thatch.

THEAKIKI, in Geography, a river of North America, which runs into lake Illinois, N. lat. 40° 52'. W. long. 89° 15'.

THEAME, in Ancient Geography, a town of Asia, in Babylonia, on the confines of Arabia Dextra. Ptol.

THEANDRIC, θεονικός, dei-virile; a term signifying divine and human, formed from θεος, God, and ανθρωπός, man.

St. Dionysius, bishop of Athens, first used the word theandric, to express a double operation, or two operations united in Jesus Christ; the one divine, the other human. The Monophysites afterwards abused it, to signify the one only operation which they admitted in Jesus Christ; in whom they believed there was a mixture of the divine and human nature, whence resulted a third nature, which was a compound of the one and the other, whose operations followed the essence and qualities of the mixture, and were neither divine nor human, both at once, or, in one word, theandric. θεονικός ομορρωπός, theandric, or dei-virile operation, in the sense of Dionysius and Damascenus, is thus exemplified by Athanasius. When Christ healed the person who was born blind, the spittle he voided was human, but the opening of the eyes was done by his divine power. And thus, in raising Lazarus, he called as man, but awakened him from the dead as God.

The term theandric, and the dogma of theandric operations, were examined with great care and attention, at the council of Lateran, held in 649, where Pope Martin solidly refuted the notion of theandric operations, and shewed, that the feme in which St. Dionysius first used the word was Catholic, and quite remote from that of the Monophysites and Monothelites.

THEANGELA, in Ancient Geography, a town of Asia Minor, in Caria.

THEANO, or Teano, in Geography, a town of Italy, in the kingdom of Naples, and province of Lavora; the site of a bishop, suffragan of Capua; 15 miles N. of Capua.

THEANTHROPPOS, θεονικός, formed from θεος, God, and ανθρωπός, man, denominated God-man; a term sometimes used in the schools to signify Jesus Christ, who was regarded as God-man; or represented by some scholastic theologians, as comprehending two natures in one person.

THEANUM, in Ancient Geography, a town of Italy, in Campania, upon the Latin way, S.E. of Caium. See THEANO.—Allo, a river of Italy.

THEATER, or THEATRE, Theatrum, formed from θεατρός, spetacle, of θεάω, I see, among the Ancients, a public edifice, for the exhibition of scenic spectacles or shows to the people.

Under the word theater was comprehended, not only the edifice of which the actors appeared, and the action passed,
THE BUT BEAUTIFUL FACE AND IS A FULL SPACE, WHICH ENCOMPASSED A SPACE CALLED THE ARCHETRA, IN THE FRONT OF WHICH WAS THE PROSCENIUM, OR PULPITUM, ON WHICH THE ACTORS PERFORMED, AND WHICH IS WHAT WE COMMONLY CALL THE THEATER, OR STAGE. THE PROSCENIUM WAS DIVIDED INTO TWO PARTS; THE ONE HIGHER, ON WHICH THE ACTORS DECLAIMED, AND THE OTHER LOWER, ON WHICH THE CHORUS WAS COMMONLY PLACED. THIS LATTER WAS RAISED TEN OR TWELVE FEET ABOVE THE PIT, FROM WHICH THERE WAS AN ASCENT TO IT; AND THUS SITUATED, THE CHORUS MIGHT EASILY TURN EITHER TOWARDS THE ACTORS OR TOWARDS THE SPECTATORS.


THE MOST CELEBRATED THEATERS REMAINING OF ANTIQUITY, ARE THE THEATER OF MARCELLUS, AND THAT OF POMPEY; WHICH ARE ALSO CALLED AMPHITHEATERS.

AT ATHENS ARE STILL SEEN THE REMAINS OF THE TEMPLE OF BACCHUS, WHICH WAS THE FIRST THEATER IN THE WORLD, AND WAS A MASTER-PIECE IN ARCHITECTURE. ALL THEATERS WERE CONFEERATED TO VENUS AND BACCHUS.

THEATER, AMONG THE MODERNS, MORE PECCULARLY NOTES THE STAGE, OR PLACE ON WHICH THE DRAMA, OR PLAY, IS EXHIBITED; ANswerING TO THE PROSCENIUM OF THE ANCIENTS.

IN ITS FULL LATITUDE, HOWEVER, THE THEATER INCLUDES THE WHOLE PLAY-HOUSE; IN WHICH SCENE IT IS A SPACIOUS ROOM, OR HALL, PART OF WHICH IS TAKEN UP BY THE SCENA, WHICH COMPRIZES THE STAGE, THE DECORATIONS, AND THE MACHINES; AND THE REST IS DISTRIBUTED INTO A SPACE, CALLED THE PIT, OR PARterre, WHICH IS COVERED WITH SEATS, BOXES, &C. AND TERMINATED WITH AN ELEVATION OF ONE OR TWO GALLERIES, DIPPOSED INTO BENCHES ASCENDING OVER ONE ANOTHER. SEE DRAMATIC SCENERY, PLASTIC ARTS, AND SCENOGRAPHY.

THEATER IS ALSO USED IN ARCHITECTURE, CHIEFLY AMONG THE ITALIANS, FOR AN AFFEMBLAGE OF SEVERAL BUILDINGS, WHICH, BY A HAPPY DISPOSITION AND ELEVATION, REPRESENTS AN AGREEABLE SCENE TO THE EYE.

SUCH ARE MOST OF THE VINEYARDS AT ROME; BUT PARTICULARLY THAT OF MONTE DRAGONE, AT PREFECATI; AND IN FRANCE, THE NEW CASTLE OF ST. GERMAIN EN LAYE.

THEATER, ANATOMICAL, IN A SCHOOL OF MEDICINE AND SURGERY, IS A HALL, WITH SEVERAL ROWS OF SEATS, DIPPOSED IN THE CIRCUMFERENCE OF AN AMPHITHEATER, HAVING A TABLE, BEARING ON A PIVOT, IN THE MIDDLE, FOR THE DISSECTION OF BODIES.

SUCH IS THE ANATOMICAL THEATER OF THE ROYAL GARDEN AT PARIS.

THE THEATER AT OXFORD IS A BEAUTIFUL BUILDING, ERECTED BY ARCHBISHOP SHELDON, FOR THE USE OF CHORALISTIC EXERCISES.

SEE OXFORD.

THEATINES, AN ORDER OF NUNS, UNDER THE DIRECTION OF THE THEATINES.

THERE ARE TWO KINDS OF THEATINES, UNDER THE TITLE OF VOL. XXXV.
faid to have been 43 stadia (1 league 1563 toises) in circumference. Its environs are embellished by two rivers, by meadows and gardens. Myron of Byzantium says, that Amphion was the first person who erected an altar to Mercury, and that the god recompensed his zeal by giving him a lyre. The Thebans carried on various wars with the Peloponnesians for ascertaining their respective limits; and against the Athenians at Platea for having fought the friendship of the king of Persia against the common interest of the Greeks. In process of time, the Thebans avenged themselves by defeating the Athenians at Delium, near the Tanagra. The Macedonians, after the battle of Cheronne, placed a garrison at Thebes, where it remained till after the death of Philip. Alexander having taken the city, and expelled its inhabitants, who retired to Athens, Callander, the son of Antipater, re-established them there, with the assistance of the Athenians, the Mefennians, and the Megalopolitans. Sylla at length reduced them to extreme misery, for having declared in favour of Mithridates.

In the time of Pausanias, the whole lower part of the town was in ruins, except the temples, and the citadel only was inhabited and denominated Thebes. The temple of Apollo was founded on an eminence near one of the gates, and the river Ison, which passed by it, gave to the god and the town its name of Istones. Mercury and Minerva had each a statue of marble at the entrance of the vestibule of this temple: that of Mercury was the work of Phidias, and that of Minerva was executed by Scopas. The statue of Apollo in the temple was wrought of cedar-wood. In this temple were also brazen tripods of excellent workmanship. Hercules Promachus had a temple near another of the gates of the city, in which was his statue of marble; a colossal figure by Alcamenes, and his labours by Praxiteles. The temple of Ammon had a statue executed by Calamis and dedicated by Pindar. Here was also the temple of Fortune, and the gods held Phoebus in her arms under the form of an infant. The temple of Ceres Theophanor, or the legislator, had been anciently the house of Cadmus, in which was exhibited a bust of the statue of the goddes. The theatre was near another gate, and near it a temple of Bacchus. The temple of Diana Euclea was in the same quarter; the statue of the goddess was the work of Scopas. Jupiter, surnamed the High, had a temple near the gate of this appellation. Here were a place of exercise and a stadium; and in the midst of the stadium was the tomb of Pindar. The river Ircé passed near Thebes, and beyond it were the ruins of the house of Pindar, and a kind of chapel which this poet had built in honour of Cybele. Her statue was formed of Pentelic marble. Entrance into the chapel was allowed only one day in the year. The temple of The mis was near one of the gates of Thebes, and her statue was of white marble. Jupiter Aegeus and the Parcae had also their temples. The statue of Hercules Rhinocolubus was in full view in this part of the city. The sacred wood of Ceres Cabiri and of Proserpine lay at about 25 stadia from Thebes. The temple of the Cabiri was at the distance of seven stadia. According to Pausanias, there was seen at Thebes a statue of Venus Urania, which was said to have been formed of parts of the ships that brought Cadmus into Greece. It was the most ancient statue in Greece. The population of this city was very considerable. When it was taken by Alexander, more than 6000 persons perished, and more than 30,000 were employed for slaves. Some priests were spared and many citizens fled. Hence we may presume, that the number of inhabitants in Thebes and its district might amount to 50,000 of all ages and sexes, without in-cluding slaves. The inhabitants, like those of Athens, were divided into three classes; the first composed of citizens, the second of naturalized foreigners, and the third of slaves. The Thebans were deemed to be courageous, inoffensive, and mild; and murders were frequently the consequence of the most frivolous quarrels. The women were both well made and generally of a fair complexion, of a noble carriage, and not inelegant dresses; their voice was remarkably sweet and tender; and that of the men harsh and disagreeable, and in some measure fitted to their character. The "sacred bat-talion" of Thebes is famous in history. It consisted of a body of young warriors, brought up together, and maintained at the public expense, in the citadel. Their exercises, and even their amusements, were regulated by the melodious sounds of the flute; and in order to prevent their courage from degenerating into blind fury, care was taken to inspire them with the noblest and most animated sentiments. Each warrior chose from the band a friend, to whom he remained inextricably united. These 300 warriors were anciently distributed in troops at the head of the different divisions of the army. Pelopidas, who had frequently the honour of commanding them, having made them fight in a body, the Thebans were indebted to them for almost all the advantages they gained over the Lacedemonians. Philip destroyed this hitherto invincible cohort at Cheronne; and the prince, seeing those young Thebans stretched on the field of battle, covered with honourable wounds, and lying side by side on the ground on which they had been Rationed, could not restrain his tears, but bore a noble testimony to their virtue as well as to their valour. Travels of Anci-naris, vol. iii. See THIBA.

Thiba, a town of Upper Egypt, on the right bank of the Nile. According to the ideas given us of this town by Homer, it was the most celebrated of antiquity. Ancient authors have given very different accounts of its extent. In the time of Strabo, this city had been destroyed. It had been ravaged by Cambyses; it was afterwards depopulated of its riches by Ptolemy Philometer; and under the reign of Augustus, it was severely treated by Gallus on account of its rebellion. From this time it fell into a state of decline, from which it has not recovered. Tacitus mentions it as a town in ruins; and Juvenal speaks of it as this city extended on both sides of the Nile, although it was more particularly situated on the right bank of this river: a considerable portion of it lay to the left, which, according to Strabo, bore the name of "Memnonium." For a further account of this city, see THIBES.

Thibes was a name given to many ancient towns. Thibe was a town of Asia, in Cilicia hypopagiania, situated on a plain, at the foot of mount Placion.—Alfo, a town of Judea, in the half-tribe of Manasseh, on this side of Jordan.—Alfo, a town of Macedonia, in the Phthiotide, 100 stadia from the town of Alos, according to Strabo.—Alfo, a town of Asia Minor, in Ionia, in the vicinity of Miletus.—Alfo, a town of Greece, in Attica.—Alfo, a town of Asia, in Catoonia.—Alfo, a town of Asia, in Syria.—Alfo, a town of Palestine, in the tribe of Ephraim.—Alfo, a town of Arabia Felix, upon the coast of the Red Sea, in the country of the Cinarcolities. Ptolemy.

Thebaid, Thebae, a famous heroic poem of Statius, the subject of which is the civil war of Thebes between the two brothers Eteocles and Polynices; or Thebes taken by Thebans.

Statius was twelve years in composing his Thebaid, which consists of twelve books; he wrote under Domitian. He is censured by the best critics, as BoiU, &c. for a vicious multiplicity of fables and actions, for too much heat and
THE

extravagance, and for going beyond the bounds of probability.

Several Greek poets had composed Thebais, or poems of this name, before him; the principal were Antagoras, Antiphanes of Coleophon, Menelaus the Argian; and an anonymous author mentioned by Paulanis, lib. ix.

Aristotle, prating Homer for the simplicity of his fable, opposes to him the ignorance of certain poets, who imagined that the unity of fable or action was abundantly provided for by the unity of the hero, and who composed Thefeids, Herculeids, &c. in each of which, they collected every thing that had ever happened to their principal person.

THEBAIS, or THEBAI, called also Said, in Ancient Geography, a name given to Upper Egypt, from its principal city Thebes. It is in Scripture called Pathros. This is the most southern part of Egypt next to Ethiopia, and is almost as extensive as all the other parts of Egypt, including the country on both sides of the Nile down to the Heptanomis or Middle Egypt; its best city, according to the ancients, being Lycopolis, (see Styur) on the western, and Antaeopolis on the eastern side of the river. These dimensions agree pretty exactly with the present extent of Al Said, the most northern city of which is Manelfet.

In this part of Egypt there were formerly several cities of great note; such as Lycopolis, on the site of which is supposed to be the present Manelfet; Hypfide, or Aboutig, about a mile W. of the Nile; Apedonepolis; Ptolemis; Abysus, once the second city of the Thebaid, famous for the magnificent palace of Memnon, but in the time of Strabo only a village; Little Diphopolis, probably the present Hou (which see); Tentyra, the inhabitants of which were famous for their eminence to the crocodile, the ruins of which are still to be seen at Dendera (which see); Latopolis, or Epyntis (which see); Great Apollinopolis, on the site of which Esfut is now supposed to stand (see Apollinis Ures, and Etpu); and Elephantine, on an island of that name, where are the ruins of a small temple. On the east side of the Nile are Antaeopolis, on the site of which Siout is supposed to have been built; Paffalus, conjectured to be the present Gava-Kibre, where is seen a very beautiful portico of a temple, with eighteen pillars, in three rows; Panopolis and Cheramis, supposed to be the same city, but distinguished by Herodotus; the site of Panopolis is said to be that of the present Akram, about a mile from the river; Chenobosco; Cane or Nespolis, perhaps the present Kene, a small town on an eminence, about a mile from the river Coptos or Kept, and called by Pliny the emporium of commodities brought from India and Arabia; Coptos, where Christians were formerly very numerous (see Coptos); Apollinopolis (see Apollinis Ures, or Apollinis Paron or Kous), and Thebes, which see. To the south of Thebes, and on the famous side of the river, were the following cities: see. Chnumis or Cnuphis; Elethya or city of Lucina; Onobos, now Comombo, or the hill of Ombo, on which are seen the ruins of an ancient temple (see Comombo); Syene; Philae, (see Ptolomos,) an island deemed facer from an opinion that Osiris was buried there. The Thebaid in the first ages of the church was rendered famous by the number of hermits who retorted thither.

THEBAIS, a river of Aia Minor, in Caria. Pliny says it traversed the town of Trallis.

THEBAN HARP. See HARP.

THEBANUS OPHITES, in Natural History, a name given by some of the ancients to that species of the ophites, or serpentine marble, more commonly called opites niger, the black serpentine.

THEBARMAI, in Ancient Geography, Ornmed, a town of Aia, S.W. of lake Spauta, and at some distance from it, lies between a mountain and a small river that falls into this lake. The worship of fire prevailed in this province, under a persuasion that the first pyreum was kindled by Zoroaster himself.

THEBES, the capital city of the Thebais, or Upper Egypt, which was deservedly reckoned one of the finest cities in the world. It was also called Dioptopolis, or the city of Jupiter, and was built, as some say, by Osiris, but according to others, by Buiris. Its length, in the time of Strabo, was eighty furlongs, or ten miles; but this was very inconsiderable, compared with its ancient extent, before it was ruined by Cambyses, which, we are told, was no less than 420 stadia, or 52 1/2 miles. Its wealth was so great, that, after it had been plundered by the Persians, what was found, on burning the remains of the pillage, amounted to above 300 talents of gold, and 2500 of silver. The 100 gates of Thebes are mentioned by Homer, and, after him, by many others; but some think that this was not the number of the gates, but of the temples; and that from them the city had the epithet Hecatompylos, expressing a definite for an indefinite number. Pomponius Mela, and others, by the 100 gates, undervind so many palaces of princes, each of whom could, if occasion, arm and send out 20,000 fighting men, and 200 chariots. A modern traveller could observe no signs or remains of walls round Thebes: and if it had none, we must conclude, that by 100 gates, were meant the gates of the temples, or rather the palaces of great men. In Strabo's time the city stood chiefly on the east side of the river. At Thebes there were anciently four remarkable temples; one of them is said, by Diodorus Siculus, to have been 1 1/2 mile in circumference, and 45 cubits in height, with walls 24 feet thick.

The venerable ruins of this city, probably the most ancient in the world, says Mr. Browne (Travels, &c.), extend for about three leagues in length along the Nile. East and west they reach to the mountains, a breadth of about 2 1/2 leagues. The river here is about 300 yards broad; the circumference of the ancient city must therefore have been about 27 miles. In falling up the Nile, the first village that occurs within the precincts is Kourna, on the W., with few houses, as the people chiefly live in the caverns. Next is Abuhedjoud, a village, and Karnac, a small district, both on the E. The largest portion of the city stood on the eastern side of the river. On the S.W. Medinet-Abou marks the extremity of the ruins; for Arment, which is about two leagues to the S., cannot be considered as a part. Modern authors have flayed the site of Thebes, "Lexos" (which see); and others have denominated it "Aktor," both of which terms are, in Mr. Browne's opinion, corruptions of "El Kaffir," the appellation still applied to the ruins by the Arabs. The most considerable ruins are thofe on the E. of the Nile. The chief of these is the "great temple," an oblong square building of vast extent, with a double colonnade, one at each extremity. The mafy columns and walls are covered with hieroglyphics. The "great temple" stands in the district called Karnac. Next to this in importance is the temple at Abu-Hedjdj, and here are numerous ruins, avenues marked with falsines, &c. On the W. side of the Nile appear two colossal figures, apparently of a man and woman, formed of a calcareous stone like the rest of the ruins;—remains of a large temple, with caverns excavated in the rock—the magnificent edifice flayed the "palace of Memnon," some of the columns being about 40 feet high, and about 9 1/2 in diameter; the columns and walls are covered with hieroglyphics; this stands at Kourna. Behind the palace is the pabbage denominated.
"Bibâni-Molûk," leading up the mountain; at the extremity of which pailage, in the sides of the rock, are the celebrated caverns known as the sepulchres of the ancient kings. These sepulchres, which have lately been discovered, are particularly described by Mr. Browne. In the cells or recesses of the pailage of the largest of these, appear the chief paintings, representing the mysteries, which, as well as the hieroglyphics covering all the walls, are very fresh. Our traveller particularly observed the two harpers described by Bruce, but his engraved figures, he found, seem to be from memory. Although Pococke and many others are of opinion that Thebes was never surrounded by a wall, Mr. Browne inclines to a contrary opinion, from some faint remains which are still visible.

We are principally indebted to Denon (Travels in Upper and Lower Egypt, in 3 vols. 8vo, translated by Aikin), for an interesting account of the magnificent ruins of Thebes, as well as of other places in Egypt, illustrated by beautiful engravings. Four large hamlets (says Denon) divide amongst them the remains of the ancient monuments of Thebes, whilst the river, by the immensity of its course, seems still proud of flowing among its ruins. In crossing the ground occupied by the ancient Thebes, Denon found nothing but temples; not a vestige of the 100 gates so celebrated in history; no walls, quays, bridges, baths, or theatres; not a single edifice of public utility or convenience. Temples indeed were numerous, and walls covered with obscure emblems and hieroglyphics, which attested the ascendency of the priesthood, who still seemed to reign over these mighty ruins. The space occupied by this incomprehensible town now enforces four villages and as many hamlets, thinly scattered over immense fields. Pafing through the territory of Thebes on another occasion, Denon saw at the distance of three-fourths of a league from the Nile, the ruins of a large temple not before noticed by any traveller, which may give an idea of the immensity of that city, since, if we suppose that it was the last edifice on the easterp side, it is more than 24 leagues distant from Medinet-Abu, where the most western temple is situated. The temple, on the site of which the village of Karnac has been built, is of such a circumference, that it would require half an hour to walk round it. Herodotus has given us a more correct idea of its grandeur and magnificence. Diodorus and Strabo, who examined it in its ruinous state, appear to have furnished a description of its present condition, but none of the travellers who have copied the accounts of these writers have presumed (says Denon) to prefer to this temple that of Apollonius at Eski, that of Tentyra, and the simple portico at Etekh. It is probable (says this writer) that the temples of Karnac and Luxor were built in the time of Sesostris, when the flourishing condition of the Egyptians gave birth to the arts among them, and when these arts were displayed to the world for the first time. Of the 100 columns of the portico of the temple of Karnac or Carnac (which fee), the smallest are 7/5 feet in diameter, and the largest 12. The space occupied by its circumvallation contains lakes and mountains. This edifice is now in a degraded state. The sphinxes have been wantonly mutilated; and the avenue that leads from Karnac to Luxor, nearly half a league in extent, contains a succession of chimerical figures to the right and left, with fragments of stonic walls, of small columns, and of statues.

Luxor (which fee), the finest village in these environs, is also built on the site of the ruins of a temple, not so large as that of Karnac, but in a better state of preservation, the maffles not having as yet fallen through time, and by the pressure of their own weight. The most colossal parts consist of fourteen columns of nearly eleven feet in diameter, and of two statues in granite, at the outer gate, buried up to the middle of the arms, and having in front of them the two largest and best preferred obelisks known.

A peculiarity belonging to the temple of Luxor, is, that a quay, provided with an eaupleum, secured the eastern part, which was near the river, from the damages the inundations might otherwise have occasioned. The eaupleum, which since its original structure has been repaired and augmented in brick-work, proves that the river has not changed its bed; and its preservation is an evidence that the Nile has never been banked by other quays, since no traces of similar constructions are elsewhere to be met with.

Nothing can be more grand, and at the same time more simple, than the small number of objects of which this entrance is composed. No city whatever makes so proud a display at its approach as this wretched village, the population of which consists of two or three thousand souls, who have taken up their abodes on the roofs and beneath the galleries of this temple, which has, nevertheless, the air of being in a manner uninhabited.

Denon has particularly described the tombs above-mentioned, in the village of Kurnu, the ancient Necropolis of Thebes; and he concludes with remarking, that the mystery and magnificence observable within these excavations, and the number of statues by which they are protected, indicate, that the religious worship which had scooped out and decorated these grottoes, was the same as that which had raised the pyramids; but our limits forbid a farther detail.

THEBET, in Chronology. See TESET.

THEBIT Ben CORAH, or THABIT BEN KORRA, in Biography, an Arabian teacher of philosophy and mathematics, was a native of Harran, and belonged to the sect of the Sabians, and on this account was surnamed "Al-Sabi-Al-Harrani." The time in which he flourished is uncertain. Some say that he was born in the 22nd year of the Hegira, or A.D. 835; others refer him to the 10th century; and others again have placed him in the 12th or 13th century. He was secretary to the caliph Mothaded; and was distinguished by his skill in the mathematics, and by his knowledge of astronomy. He is said to have observed the declination of the ecliptic, which he fixed at 23° 33' 30"; and from this circumstance it has been concluded, that he lived in the 12th or 13th century, or that he was contemporary with Almeon and Profalus, who about that period attested to the ecliptic the fame declination. To Thebit has been ascribed the origin of the astronomicel feet, which maintained the tredipation of the fixed stars. It was his opinion, founded on some erroneous observations, that the fixed stars moved for some time according to the order of the signs; that they afterwards proceeded in a retrograde direction and returned to their former places, after which they assumed a direct motion; and that then they had an irregular motion, which was rapid for a certain period, then became slower, and at last insensible. According to Thebit, the obliquity of the ecliptic was variable, and subject to similar periods of increase and decrease. His opinions prevailed for a considerable time, not only among the astronomers of his own nation, but among some Chritians. Montucla Hist. de Math. Pococke, p. 377. Fabr. Bib. Grac. v. ii. p. 354.

THECA, SHEATH, in Anatomy, hollow organs, serving to contain others. The threes of the fingers are strong sheaths binding down the flexor tendons. The theca vertebralis is the sheath of dura mater lining the vertebral canal, and containing the medulla spinalis.
THECA, in Botany, the Latin word for a cell, breath, or cage, is used occasionally by some botanists in their descriptions of feed-vessels; and especially by Acharium, for those minute vertical parallel cells, in the disk of the shields or tuberclos of a Lichen, in which its seeds are lodged. See Lichenes and Penzia.

THECHES, in Ancient Geography, a mountain of Asia, in Armenia, according to Xenophon, who says that the Greeks, after leaving Gymnias, arrived on the fifth day at the sacred mountain called Theches, and from thence they for the first time perceived the Euxine Sea, which occasioned loud exclamations of joy.

THECUA, a town of Palestine, in the tribe of Judah; situated 12 miles S. of Jerusalem, according to Eusebius and Jerome. Josephus says that it was in the vicinity of Herodium. See Tekoa.

THEDINGHAUSEN, in Geography, a town of Germany, in the county of Hoya; 12 miles N. W. of Hoya.

THEDO, in Ichthyology, a name given by Figulus and others to the trout.

THEFT, Punum, in Law, an unlawful, felonious taking away another man's moveable and personal goods, against the owner's will, with an intent to retain them. See Larceny.

Open theft from the person, or in the presence of the owner, is properly called robbery, which see.

THEFT-BOTE, the receiving of a man's goods again from a thief, or other amends, by way of composition; and to prevent prosecution, that the felon may escape unpunished; the punishment of which is now fine and imprisonment.

This is frequently called compounding of felony. By 25 Geo. II. c. 36, even to advertise a reward for the return of things stolen, with no questions asked, or words to the fame import, subjects the advertiser and the printer to a forfeit or of £5. each.

THEFENEKE, in Geography, a town of Carinthia; 3 miles N. E. of Wolfsberg.

THEIMSDORF, a town of Lusatia; 6 miles E. of Rothenburg.

THEIRRED, in Biography, precentor of the monastery of Dover, and author of a treatise on music, in Latin, preferred among the MSS. of the Bodleian Library, in three books, written about the year 1371.

The first book treats of musical proportion; "De Proportionibus Musiciorum Sonorum." This is a very early treatise upon harmonics, in which, when he speaks of the major and minor femitone, and of the different portions into which they are divisible, his doctrine is illustrated by many numerical tables, and nice splittings of tones into commas; "De Comatis; alia Proportio ejusdem Comatis, et c." which prove a temperament of the scale to have been then in use.

The second book treats of musical concords; "De Consonantia Musiciorum Sonorum." Here, after specifying the different kinds of concords, he informs his reader, that in organis and major and minor thirds, as well as sixths, are admissible in succession.

The third book contains diagrams and scales innumerable of different species of octave, in a literal notation. No musical characters, or examples of practical music in common notes, appear throughout the treatise.

The praises bestowed by Pits, Bale, Tanner, and others on Theinred, whose name is sometimes written Thaured, and thenred, make it necessary to acquaint such of our readers as may be inclined to take the trouble of examining this tract themselves, that, like many other musical writings of the middle and lower ages, it but ill rewards the drudgery of an entire and careful perusal; for after perusal it has vanquished the abbreviations, and the barbarism and obscurity of the Latin, the vain speculations and useless divisions of the scale, with which this work is so much abounds, and which could have been but of small utility to practical music, at the time when it was written, are such, that now, since the theory of sound is so much better understood, and explained by the writings of Galileo, Mercers, Holder, Smith, and many others; our old countryman, Theinred, may henceforth remain peaceably on his shelf, without much loss to the art or science of music. Bodl. 842. 1. De legitimis ordinibus Pentachordorum et Tetrachordorum, Pr. Quomun Musiciorum de his Cantibus frequents eft distincion, &c. 46 folios, small size. Wükker in his Lexicon calls this work a Phænix.

THEICRUS, in the Materia Medica of the Ancients, a name given by some to the melanteria.

The name theicrus signifies only sulphur-coloured, and was at first used with the name of vitriol, as expressive of the difference of this kind from others; but in time it became common to use it alone.

THEISM. See Deism.

THEISOA, or Thimoa, in Ancient Geography, a town of the Peloponnesus, in Arcadia.

THEIUM, a town of Greece, in Athamania.

THEIUS, a river of the Peloponnesus, in Arcadia, which discharges itself into the Alpheus.

THEKA, in Botany, the Malabar name of the Teak tree, returned as generic by Jussieu. See Tectona.

THEKUPHE. See Tekuha.

THELA, in Botany, so called by Lourié, Cochinch. 119, from όση, a nipple, in allusion to the little glandular prominences which cover the calyx, appears, by his description, to be the same genus with the Limnean Plumbago. See that article.

THELARY, in Geography, a town of Hindoostan, in Bahar; 18 miles S. W. of Bahar.

THELBALANA, in Ancient Geography, a town of Asia, in the Greater Armenia. Ptol.

THELENCANA, a town of Asia, in Babylonia, on an arm of the Euphrates.

THELDA, a town of Asia, in Mesopotamia, on the banks of the Euphrates. Ptol.

THELE, a word used by some to express the nipple, and by others for the whole breast.

THELEBOE, in Ancient Geography, a people of Epirus, in Aecnamis, who passed into Italy, and established themselves in the island of Caprea.

THELEBOLUS, in Botany, from θεληθη, a nipple, and θεληθη, a calf, or throw, because the little vessel, lodging the seeds, resembles a nipple, and is thrown off with a degree of elasticity. The name was originally written Thelebolus, but the above is justly preferred.—Tode Mecklentb. v. t. 41. perf. Syn. 116.—Class and order, Cryptogamia. Nat. Ord. Fungi angiospermi.

Eff. Ch. Receptacle cup-like, somewhat globoso, entire at the edge, discharging a papillary, nearly naked, feed-vessel.

1. Th. flavus. Small Nipple-fungus. Perf. n. 1. Tode n. 1. t. 7. f. 56.—Found by Tode on the dung of swine, after rainy weather in June and July. He compares it to the rose of fih in appearance, and to poppy-feed nearly in size. The colour is a tawny yellow. Each individual is globular, attached at the bottom by capillary roots, and crowned with a small papillary tubeckle, of a more
more orange or golden hue than the rest. This is at length thrown off, with a sudden and strong elastic force, leaving a minute, bordered, viscid pit, or cup, which gradually dilates into a level surface.

The minute fungus above described is closely related to Sphagnetopsis, and still more nearly perhaps to Pilobolus. (See those articles.) Whether it might be allowable to comprehend under one genus, may admit of much dispute. Even the many-eleft receptacles, or involucres of Sphagnetopsis can hardly be deemed a sufficient important difference to supersede this measure, and still left the elongated figure, or pellicul subsance, of Pilobolus. Botanists who follow their concentrated attention exclusively on particular tribes of plants, are prone to multiply distinctions; but they are not rashly to be corrected by those who have not looked so closely, nor, perhaps, so well.

THELEDA, in Ancient Geography, a town of Asia, in Syria, situated on a plain W. of Seriana, and E. of Capparex.

THELEPHORA, in Botany, from $\theta_{\lambda} \nu \mu \alpha$, a nipple, and $\gamma_{\nu} \mu \varepsilon$, to bear, because of the generally papillary covering of the under surface.—Wild. Berol. 296. Perf. Syn. 565. Schrad. Specil. 182. (Craterella; Perf. Obs. Mycol. v. 1. 39. Corticium; ib. 37.)—Clasf and order, Cryptogamia Fungi. Nat. Ord. Fungi gymnocarpi.

Eff. Ch. Head coriaceous, dilated; minutely papillary, finely, or smooth, beneath. An ample, and, in our opinion, rather vague genus of the fungus tribe, of which Peron reckon up forty-four species, ranged under three sections, once confidered by him as distinct genera. We shall, after our usual manner, feel a few examples of each.

Sec. 1. CRATERELLA. Head undivided, hollow or funnell-shaped above, with a fluffy edge. Two species.

Th. piluloid. Pale Thelephora. Perf. n. 1. "Ict. et Defer. Fung. 3. t. 1. f. 35. sub Craterella."—Aggregates, corky, pale. Head concave, fthaggly with fables.—Rarely found on the ground in moist woods. The fball is very fhort, villous at the fpace. Head rough with fides, with little bristles, visible under a magnifying glafs. Perfon.

Th. caryophyla. Carnation Thelephora. Perf. n. 2. Albert. and Schwein. Nifk. 272. (Craterebellum ambiguia; Perf. Obs. Mycol. v. 1. 39. f. 8—10. Helvella caryophyla; Scheff. Fung. v. 4. 115. t. 325. Dickf. Crypt. facie. t. 20. Auricularia caryophyllea; Buliardi. t. 278. 485. Sowerb. Fung. t. 215.)—Head funnell-shaped, thin, purplish-brown, fringed, varifiously jagged or clinifed. Found on the ground in fir woods. Mr. Woodward firft met with this fpecies in Britain, near Bangay, Suffolk. Continental botanists ufually fpeak of it as rare, but Mr. Sowerby fays it is "a very common parasite on the exfpoed fantastic roots of old firs, in autumn." The funbance is tough and somewhat woody; the colour a fweet-brown. The plants often grow in mafhes, atached by their upper fide to ficks, old bark, &c., and are from one to three inches in diameter. Sometimes the fluffy edge is white. Perfon in his Obs. Mycol. above quoted feems difposed to think the preffent fungus may vary fo much as to become Rhamaria palmata of Holmikiold, Fung. Dan. v. 1. 166. t. 335; but fully the multiplied divifions and ramifications of the latter, as well as its smoothness and colour, preclude fuch an idea.

Sec. 2. STEHUM. Head balved, finally horizontal. Thirteen fpecies.

Th. terrictrum. Ground Thelephora. Perf. n. 3. Ehrl. Crypt. n. 179. (Th. metenterterrarium; Wildil. Berol. 357. t. 7. f. 15.)—Somewhat imbricated, dull brown. Head flattened, fthaggly with fibres. On sandy ground. This seems to us a mere variety of the last, or rather its most usual form, as reprefented in Mr. Sowerby's t. 213. Yet Peron cites this plate, with doubt, under his fourth fpecies, Th. lactinata. He fays to lay too much frels on the abfence or presence of a fball, and perhaps makes too many difficultions.

Th. rubiginofa. Rusty Thelephora. Perf. n. 6. (Th. fragilis; Ehrl. Crypt. n. 278. Helvella rubiginofa; Dickf. Crypt. facie. t. 20. Auricularia ferruginea; Buliardi. t. 278. Sowerb. Fung. t. 26.)—Imbricated, rigid, rufly-brown, smooth on both fides, with cattered, rather large, knobs. Not uncommon on gate-potts or pales, generally placed so low as to be partly hid by the earth and neighbouring plants, as Mr. Sowerby remarks. It is very diftinct from the foregoing, soft like velvet to the touch; the under fide bearing scattered, roundifh prominences, which, however, do not appear concerned in the frutification. The edge is usually pale. No part is hairy or fthagggy. The diameter of each plant is about an inch.

Th. ferruginea. Stiff-coloured Thelephora. Perf. n. 9. Albert. and Schwein. Nifk. 273. (Auricularia tabacina; Sowerb. Fung. t. 25.)—Aggregates, rounded, coriaceous, convex, fomewhat zoned, yellow-brown; fthaggly above, smooth and tanvly beneath. Frequent on fumps and rotten branches, in various situations. The plants are fefile, attached by the back, projecting over each other, of an elegant undulated figure; the colour of both fides a bright reddifh-brown, especially the upper, elegantly contracted with the light-yellow border.

Th. hirsuta. Common Hairy Thelephora. Perf. n. 11. Wildil. Berol. 397. Albert. and Schwein. Nifk. 274. (Th. pallaide; Ehrl. Crypt. n. 169. Auricularia reflexa; Buliardi. t. 274. Sowerb. Fung. t. 27.)—Aggregate, rounded, coriaceous, convex, fomewhat zoned, yellow-brown; fthaggly above, smooth and tanvly beneath. Frequent on rotten fumps, potts, pales, tubes, &c.; either growing solitary, and roundifh, about an inch in diameter; or incontinued, confluent, fomewhat imbricated maffes. The under fide is yellow or tanvly; the upper of a pale yellow-brown, marked with different concentric shades, and rough with imbricated soft fthaggly hairs. The whole is often tinged with black, as if smoked. It varies in fize as well as colour, and often confifts of an expanded orange-coloured funace, closely prefied by its back to the wood, previous to its acquiring any projection by which the upper fide is exposèd. In this flate it might be referred to the next fection. Auricularia papyrina, Buliardi. t. 402, foems nearly akin to this.

Sec. 3. CORTICUM. Plant laid entirely on its back, imbricated in form, papillary, various in funace. Thirty-two fpecies, divided into subordinate fections, according to the colour, whether pale or dark red, yellow-brown, grey, or white.—It is very necfary to trace the progres of the fpecies of this divifion, in order to be certain they do not, at any period, acquire a distinct upper funace, fo as to range under the preceding.

Th. querina. Oak Thelephora. Perf. n. 16. Albert. and Schwein. Nifk. 276. (Th. carnea; Ehrl. Crypt. n. 269. (Auricularia corticalis; Buliardi. t. 436. f. 1.)—Oblong, coriaceous, ringed, pale flesh-coloured; the margin somewhat involute, of a blackifh-brown at the back.—Found running longitudinally along decayed branches of oak. Each plant is two or three inches in length, somewhat oval, of a light fhef-coloured hue, with a powdery or downy funace, which water will not moisten, and which is befprinkled with round defpeffed protuberances, obfcurly repce.
representing the shields of a *Lichen*. The margin soon becomes elevated and infixed, especially by drought or cold, and displays the blackish under side, which ought to be the upper.


Th. fanguiaca. Gory Thelephora. Perf. n. 27. (Tremla cruenta; Engl. Bot. t. 1800.)—“Widely spreading on the ground, somewhat gelatinous, blood-coloured, smooth.”—“This singular species,” says *Perfson*, “grows in the streets of towns, among the walls of houses, looking at a distance like blood poured on the ground. By drying it becomes paler. Is it not rather to be referred to the order of Algæ?” In this last suggestion we readily concur. The whole is truly an expanded mass of minute, uniform, gelatinous, pellucid granulations, with nothing of a coriaceous or fungous texture, nor any other character of the present genus.

Th. hydnoida. Aawl-bearing Thelephora. Perf. n. 28. Albert. and Schwein. Ninf. 279. (Corticum hydnoidenum; Perf. Ohn. Mycol. v. 1. 15.)—Spreading, concealed, orange-yellow, bearing aawl-shaped elongated prominences.—This spreads under the cephalic cuticle of decayed dry branches of beech, which it sometimes totally encircles, extending to the length of four or five inches. Its great peculiarity consists in the awl-shaped projections, thrown out from its surface, to the height of two or three lines, which either penetrate, or force off, the superjacent cuticle of the tree, and, except in their great irregularity of size and figure, resemble the prickles of a *Hydnrum*.

Th. umbrina. Umber-brown Thelephora. Perf. n. 36. Albert. and Schwein. Ninf. 281. —Spreading on the ground, soft, of an umber brown; the margin whitish and rather downy.—Found on the ground, in a sandy soil, spreading to the extent of two or three inches, and not of a very thin substance. *Perfson* speaks of it as very rare, but the observing authors of the Fungi *Nifienfis* find it not unfrequently, in August and the following months, in sandy sandy places.

Th. *cefa*. Grey Ground Thelephora. Perf. n. 40. (Corticum caesum; Ohn. Mycol. v. 1. 15. t. 3 f. 6.)—Orbicular, on the ground, nearly smooth, of a greyish ash-colour.—Not unfrequent in autumn, on the bare ground, from one and a half to three inches broad, with a white, fibrous, rounded, scalloped edge. The grey surface is besprinkled with minute powdery specks, regularly disposed in spots, four together. *Perfson*.

Th. *laeta*. Milk-white Fr Thelephora. Perf. n. 45.—“Nearly orbicular, of a livid white; somewhat flethy in the middle; fibrous at the margin.”—Rarely found on the bark of the Spruce Fir. The surface is smooth. The colour becomes paler by drying. *Perfson*.

Albertini and Schweinitz describe several more species of this genus, to which every thing of a membranous texture, and fungous aspect, seems to be referred by authors. Some such may possibly be imperfect vegetable productions, whose growth, when completed, might prove them of a different nature. When their smooth surface discharges powdery specks, they are to be considered as perfect species of *Thelephora*.

**THELIGONUM.** See *THELIGONUM*.

**THELMENISSUS**, in Ancient Geography, a town of Asia, in Syria, on an immense plain on the E. of the Orontes, N. of Apamea, and S.W. of Chalcis.

**THELONIUM, TELONIUM,** signifies toll.

Among the Romans, *telonium* denoted a custom-houle, or place where the toll was collected.

**THELONIO, Browe effendi qui te de,** a writ lying for the citizens of a city, or burgesses of a town, that have a charter or precept to free them from toll, against the officers of any town or market, who would contrain them to pay it, contrary to the said grant or precept.

**THELONIUM Racionali, habendo pro dominis bakelitsus dominica regis ad frinnam, a writ lying for him that hath of the king’s demesne in fee-farm to recover reasonable toll of the king’s tenants there, if his demesne hath been accustomd to be toll’d.

**THELOTREMA,** in Botany, from τὸς, a nipple, and ὁριστις, an orifice, in allusion to the pierced protuberances of the crust; a genus of the order of *Lichen*, instituted by Acharius, in his *Methodus*, 190. The original type of this genus is *Lichen pertusus* of Linnaeus, which is reduced, by the writer of the present article, to *Endocardium* (see that article,) in *Prod. Fl. Græc.* v. 2. 304. The rest of the supposed species may perhaps be in like manner disposed of, or referred to *Urecologia*.

**THELPUISA, in Ancient Geography.** See *THALPUSA*.

**THELSE.** See *THALSE*.

**THELYGONUM, in Botany,** a name of very whimsical derivation, concerning which Linnaeus has fallen into an error, like professor Martyn and M. de Theis, who have both of them been lefs penetrating than usual in their enquiries. They all deduce it from τὸς, a nipple, and γωνία, a joint, or knee; and the last of them supposes the original plant, which was our *Mercurialis*, (see that article,) to have been called τὸς κοινος, because its swelled joints resembled the knees of a woman. This we modestly presume to be a very unauthorized comparison; and Pliny, from whom the name is borrowed, leads us to a less injurious, if not a wiser, solution. His sapient pages assure us that *Arjenunon* (Ἀρφάνων, or Αρφάνιον) was taken to procure male children, its fruit resembling a part of the male organs; while *Thelygonum*, which, though otherwise the same, bore no such fruit, was supposed to cause the production of females. The word therefore is composed of τὸς, and γωνία, generation, or offspring, τὸς κοινος, a leaf, being understood, a confirmation of which may be found under the 6th species of our article *Mercurialis*, above-mentioned. If we may be allowed to play further upon this word, we should remark that its own generation is truly asile. Yet hence arose Buehins’s *Mercurialis tephroclata, tephrot spicata, tephrot femina*; apppellations perverely bestowed on the two sexes of our *Mercurialis annua*, as well as of *perennis*. How Linnaeus came to transfer *Thelogonum* to the genus which now bears it, can no otherwise be accounted for, than from the supposed affinity of the plants to each other, and both having borne the name of *Cynocrambe*, or Dog’s Cabbage; a name retained by Gartner, after Tournefort, and liable to no objection, except being composed of one already established, which doubtles caused Linnaeus to reject it. The imaginary affinity just alluded to has apparently stamped a poisonous character on the herb before us, which, considering its natural order, is probably undeserved.—Linn. Gen. 490. Schreb. 644. Willd. Sp. Pl. v. 4. 420. Mart. Mill. Diss. v. 4. Ait. Hort. Kew. v. 5. 285. Sm. Prod. Fl. Græc. Sibth. v. 2. 237. Juff. 405. Lamarcck Illutr. t. 777. (Cynocrambe; Tourn. t. 485. Garin. t. 75.)—Clas and order, *Monococc Polyandria*. Nat. Ord. Scabridse, Linn. Urtes. Juff.

Gen. Ch. Male, el. Perianth of one leaf, turbinate, coloured, cloven half way down into two revolute segments. Cor. none. Stam. Filaments numerous, from six to twelve.
or more, capillary, prominent, as long as the calyx, anthers versatile, linear, straight.

Female, on the same plant, Cal. Persianum minute, of two erect, lanceolate, acute, lateral leaves, permanent. Cor. none. Ptilt. German inferior, globose; style lateral, between the calyx-leaves, thread-shaped, much longer than the germen; stigma simple, curved. Peric. none. Seed solitary, globose, seated on a callose annular receptacle, which falls off with it.


Female, Calyx lateral, of two leaves. Corolla none. Style one. Seed naked, on a deciduous annular receptacle.

1. Th. Cyanoecrum. Dog's Mercury. Linn. Sp. Pl. 1441. Willd. n. t. Ait. n. 1. Sm. Fl. Grcec. Sibth. t. 941, unpublished. (Cyanoecrum Dieiroides; Bauh. Prodr. 59. C. alineolata; Barbel. t. 335. Albinse facie planta nova; Commun. Phyt. 28. t. 30. ed. alt. 120. t. 36.):-The only known species, found in waste ground and the shuffles of rocks, especially in shady or moist places, in the south of England, as well as in Alto, flowering at almost all seasons. About Rome and Naples it is very frequent. Its seeds may have been brought, from time to time, into our curious botanic gardens, but the plant has no charms, nor any known quality, to render it a popular favourite. The root is annual, simple, cylindrical, with many fibres below. Sems several, spreading or prostrate, a span long, leafy, feebly branched, round, very smooth and shining, mostly purplish. Leaves alternate, flaked, each with an axillary tuft of smaller ones, ovate, rather fusculent, an inch, or thereabouts, in length, of a bright shining green, very smooth on both sides; roughish at the edges. Flowers small, white, from the blosoms of the upper leaves. The calyx of the males is not unlike the corolla of a honey-luckle in miniature. Seed purplish-brown, furrowed, not much bigger than mullein-seed. The general aspect of the plant evinces its affinity to Paritaria, though the flowers in detail are extremely different. Dr. Sibbdoch's figure has but six flaments. We have usually found more, and authors describe from twelve to nineteen.

That this herb is the Call, or nography, of Dieciroides, there can scarcely be a doubt. He describes it sufficiently well, and informs us that it was sometimes called Wild Male Mercury; which renders the name of Thelymiton still more unsuitable; but Linnaeus did not always search deeply into such matters, though he will commonly be found quite as learned as most of his critics or correctors. Dieciroides speaks of the plant in question as a gentle purge. This probably caused the Mercury to be taken with the same intention, though at the peril of the patient's life, as we have already mentioned in its proper place; where also it may be seen that some of the earlier European botanists took that very plant for the thymiton.


Gen. Ch. Cal. Persianum of three equal, ovato-lanceolate, coloured leaves, exactly resembling the petals. Cor. Petals two, ovato-lanceolate, the size of the calyx, and exactly like it. Nectary a fiddle lip, of the shape, size, and appearance, of the petals and calyx, without a spur. Stam. Anther parallel to the stigma, permanent, of two cells close together, attached to the central lobe of a three-cleft hooded appendage to the column; "maffes of pollen powdery, pendulous by a thread from the gland of the stigma." Brown. Ptilt. German inferior, ovate; style short, united with the hood; stigma in front, obtuse. Peric. Capsule obovate, furrowed, with one cell and three valves. Seeds numerous, chaffy.

Eff. Ch. Calyx-leaves coloured, the size and figure of the petals and lip. Column encompassed by a three-lobed hood. Anther parallel to the style, permanent.

1. Th. Forstferi. Forster's Thelymitra. Swartz Act. Holm. 1800. 228. t. 3. f. L., c. Willd. n. t. (Th. longifolia; Forst. Gen. t. 49. Serapias regularis; Forst. Prodr. 59.)-Lateral segments of the hood plumous: intermediate one vaulted. Clutter many-flowered.—Gathered by Forster in New Zealand. The stem is above a foot high, round, fringed, somewhat spiralled, clothed with a few sheathing lanceolate leaves. Clutter terminal, erect, three inches long, of about a dozen upright flowers, fearfully half the size of the next species, each accompanied by an elliptic-lanceolate acute bract, longer than the partial flake. Of the colour of the flowers we have no information. Their hood appears, by the dried specimen, as well as Forster's figure, to have its middle segment vaulted, convex, and mid-divided.

2 Th. ixiolida. Large-flowered Thelymitra. Swartz Act. Holm. 1800. 228. t. 3. f. L, a, b, d—g. Willd. n. 2. Br. n. t. Ait. n. 1. Sm. Exot. Bot. v. t. 55. t. 29. Lateral segments of the hood plumous: intermediate one three-cleft; its lateral lobes jagged; central one short, cloven, crested at the back. Clutter many-flowered.—Found in the neighbourhood of Port Jackson, New South Wales, from whence we received specimens and drawings about the year 1790. Mr. G. Caley sent out plants to Kew in 1810, but they do not appear to have succeeded there. This is a larger taller species than the foregoing; its flowers above an inch in diameter, very handsome, of a fine blue, spotted, according to Mr. Brown, with a deeper colour. The hood is fringed with hairs, just below the summit, and overtopped by its two lateral, flaked, plumous tufts. The calyx, petals, and lip, spread almost equally in both thefe, and we believe, all the following species, except our n. 9, Mr. Brown's venosa.

3. Th. media. Intermediate Thelymitra. Br. n. 2.—"Outer segments of the hood plumous; intermediate one naked at the back, three-cleft; its central lobe emarginate, half the length of the others. Spike (or clutter?) many-flowered."—Gathered by Mr. Brown, near Port Jackson.

4. Th. canaliculata. Channeled Thelymitra. Br. n. 3.—"Outer segments of the hood plumous; intermediate one naked at the back, many-cleft; lobes corrugated; the outer one longed and mottled remote. Spike many-flowered."—Found by Mr. Brown, in the tropical part of New Holland.

5. Th. purpurata. Few-flowered Thelymitra. Br. n. 4.—"Hood half the length of the petals; its outer segments plumous; intermediate one naked at the back, emarginate, with rounded entire lobes. Spike of few flowers."—Gathered by Mr. Brown, near Port Jackson.

6. Th. nudata. Naked Thelymitra. Br. n. 5.—"Hood half the length of the petals; its outer segments plumous; intermediate one naked at the back, emarginate, with rounded entire lobes. Spike many-flowered."—Gathered in the island of Van Diemen, by Mr. Brown. By the above definition,
THELYPHONON, from δόξα, female, and σῶς, murder, or destruction, the name of an herb mentioned by Pliny, book 25, chap. 10, which he says is by some called Scorpiun, from the resemblance of its root to a scorpion, and the touch of which is fatal to that animal, as a remedy for whose sting it is given internally. He adds, that the same root kills any cat of quadrupeds, if applied to the parts of generation; and that its leaf, which resembles that of Cyclamen, produces the same effect within the course of a day. His description answers to the Dornicus foepsoides, Willd. Sp. Pl. v. 3. 2114; D. laetifolium, Clus. Hist. v. 2. 16; Great Leopard’s-bane, Ger. Em. 759; but there is apparently much superflition, mistake, or exaggeration, intermixed in his relation.

THELYPERIS, from δόξα, female, and σῶς, a fern, a name by which Pliny designates a species of the Fern tribe, whose habit appears to be more delicate than that of his Filis max, or Male Fern. The latter should seem, by his description, to be our Pteris aquilina. (See T. ERFIS.) The name of Filis max, however, has remained with a large species of Alsifodium, Sm. Pl. Brit. 1121. Engl. Bot. t. 1458; and that of Filis femina with a more slender and finely-divided one of the same genus, Engl. Bot. t. 1459; while a third, whose texture is more thin and tender than either, has received the appellation of Alsifodium Thelyperis. They were all referred by Linnaeus, under the same specific names, to Polypondium. (See that article.) Our present Thelyperis, therefore, must not be taken for that of Pliny, being rather a north-country plant, not hitherto noticed in Greece by any botanical traveller.

THEMA, in Ancient Geography, a town of Syria, in the Chalchonite territory; and also of Arabia Deserta.

THEMEN, a town of Arabia Petra, 5 miles from Petra, which had a Roman garrison. —Allo, a town of Judea, in the half-tribe of Manasséh, on the other side of Jordam; famed for the wildness of its inhabitants. Eliphaz, one of Job’s three friends, came from this place.

THEMAR, in Geography, a town of Germany, in the county of Hennberg, on the Werla; 12 miles s. e. of Meiungen.

THEME, THEMA, a subject or topic, upon which to write or compose.

Theme, among Astrologers, denotes the figure they construct when they draw the horoscope; representing the state of the heavens for a certain point, or moment, required; i.e. the places of the stars and planets for that moment.

The celestial theme consists of twelve triangles, included within two squares, and called the twelve houses.

Theme, in Grammar, denotes a verb, considered in its primary and absolute sense, and not limited to any particular mode or tense; or it is the verb in its primitive radical state, whence its different formations are derived.

Theme, in Music; Thema, Lat.; Thema, Ital.; Motivo, soggetto, is a series of notes selected as the text or subject of a new composition, or an old favourite and well-known air to grace and embellish with variations. About the middle of the last century, the musical world was overwhelmed with dull, unmeaning, and monotonous variations to old and new tunes, which consisted of nothing more than a regular multiplication of notes, without fancy, taste, or harmonical resources; till Haydn, in the flow and graceful middle movements of his quartets and symphonies, by a richness of imagination, by double counterpoint, and inexhaustible resources of melody and harmony, rendered variations the most ingenious, pleasing, and heart-felt of his admirable productions à grand orchestre; and Mozart, in a totally different style, and for a totally different purpose, has rendered little favourite French, Italian, German, and English airs the most beautiful, amusing, and useful compositions for the piano forte that have ever been produced since the invention of that instrument. More than twenty of these have been printed in England that were brought from Vienna by Mrs. Peploe, who played them, as she did all other music, with a firmness, accuracy, and spirit, which neither dilettante nor professor has ever exceeded.

These themes seem to have been a series of leffons, composed expressly to form the hand and taste of some disciple of the author, who promised to be a great performer. In every one of these themes, there are some peculiar difficulties of execution, refinement, and expression to vanquish, at which it is in vain for mediocrity to aspire.

THEMEDA, in Botany, a genus of grasses, so called from its Arabic name Themed.—Forke. Egypt.-Arab. 178. Juss. 447.—It is found in Yemen, near Haddie. Forskal names the only species T. triandra, and describes it as follows.

"... A polygamous grass. Spikes proceed from a sheath, capitate; the outer ones whorled, male. Calyx of one valve, single-flowered. Corolla of two valves. Styles and ams wanting. In the middle of the head of flowers arises a short flalk, bearing two ifalked male spikes, and a sessile hermanphrodite one; the calyx is of one valve, corolla of two; am proceeding from the receptacle, much longer than the flower."

3 N
THE TOWN

As recorded by Diodorus, and it is by an event never faid, this does not appear that Vahl, Willdenow, or any other author, has adverted to Themeda, except Jaffue, who has merely admitted it, on Forkall's authority, into his appendix, without examination or elucidation.

We premise here to observe, that every correct writer ought invariably to cite the page of his author; especially in referring to a confused posthumous work, without an index, like that of Forkall.

THEMIS, in Ancient Geography, a town of Africa Propria, situated between Tabraca and the river Bagradas. Themis, in Geography, a river of Transylvania, which runs into the Aluat, near Marienburg. Themis, in Astronomy, a name given by some to the third satellite of Jupiter.

Themis, according to Diodorus, established divination, sacrifices, the laws of religion, and every regulation that contributed to maintain order and peace among men. She also applied herself to astrology, inflicted predictions, and after her death temples were erected to her, in which oracles were delivered. She had a temple on mount Parnassus, and another in the citadel of Athens.

THEMISCYRA, in Ancient Geography, a town of Asia Minor, in the kingdom of Pontus, situated in the open country to which it gave name, upon the banks of the river Thermodon, towards its mouth in the Euxine sea. Diodorus Siculus says that it was a royal city of the Amazons, and that they founded it.

THEMISIUMON, a town and country of Asia, in Phrygia.

THEMISSUS, a town of Asia Minor, in Caria.

THEMISTEAS, a promontory of Asia, in Carmania.

THEMISTIUS, surnamed Euphrates, or the fine speaker, in Biography, an Eclectic philosopher, was born in an obscure village of Paphlagonia, about the year 317, and having fixed his residence at Constantinople, taught eloquence and philosophy with great reputation and success. His disciples, both Pagan and Christian, were numerous; to the former clas belonged Libanius, and to the latter, Gregory Nazianzen. By the emperors he was highly esteemed, and they conferred upon him distinguished honours. In the year 355, Constans admitted him into the senate; and in return for an eloquent eulogium, presented him with a brazen statue. Julian corresponded with him as a friend; and in 362, appointed him prefect of Constantinople. His character and eloquence induced other emperors to bestow upon him peculiar favours. When Jovian inflicted his edict of toleration, Themistius was deputed by the senate to express its loyalty; and on this occasion he expatiated with elegance and liberality on the rights of confidence, and the independence of the human mind. Of his candour and liberality, the following magnificent instance is recorded by Socrates, Sozomen, and other ecclesiastical historians. The emperor Valens, who favoured the Arian party, treated the Trinitarians with great severity. Themistius, disapproving the measures which the emperor pursued, addressed him in an eloquent speech, rating that the diversity of opinions among Christians was inconsiderable, compared with that of the Pagan philosophers; and urging upon his attention, that this diversity could not be displeasing to God, since it did not prevent men from worshipping him with true piety. By such arguments, Themistius, it is said, prevailed upon the emperor to treat the Trinitarians with greater lenity. What an example does this Pagan philosopher exhibit even to Christian divines! In the year 376 Themistius visited Rome, but though solicited to take up his abode there, he preferred returning to Constantinople. It redounds very much to the honour of this philosopher, and also to the liberal sentiments of Theodosius the Great, that during his visit to the Western empire, the emperor entrusted Themistius, notwithstanding the difference of religion, with the care and education of his own Arcadians. Themistius was no less distinguished by gentleness of temper and urbanity of manners, than by his eloquence and wisdom, and ability in the conduct of public affairs. After a long course of civil honours, he withdrew about the year 387, at an advanced age, from public business; and soon after died. Themistius, the subject of this article, who does not appear to have ever departed the Pagan schools, should be distinguished from a Christian deacon of the same name, who lived after the council of Chalcedon, held in the year 551, and who was the head of the sect called Acnemont; which see. As a philosopher, Themistius illustrated several of the works of Aristotle, particularly the Analytics, the Physics, and the book on the Soul, in commentaries, written with great perspicuity and elegance. His "Orationes," which were thirty-six, and of which thirty-three are still remaining, are strongly marked with the same characters. The best editions of his Orations are those of Petavius, Gr. and Lat. Paris, 1618; and of Hardouin, Gr. and Lat. Paris, fol. 1684. Fabr. Bib. Graec. Brucker by Enfield. Gibbon. Lardner's Works, vol. viii.

THEMISTOCLES, an Athenian statesman and commander, the son of Nectes, a person of middle rank at Athens. At a very early age he manifested, both in his amusements and in his literary pursuits, those views and inclinations, which marked the character and destiny of his mature years. To those who ridiculed him on account of his apparent contempt of ornamental accomplishments, he replied, "It is true, I never learned how to tune a harp, or play upon a lute; but I know how to raise a small state to a great one." Ambition seems to have been his ruling passion, and he lost no opportunity of acquiring military and political distinctions. He fought popularly with a view to his personal advancement; and he pure and disinterested in his principles than Arifides, his lothitude for the glory of his country was subservient to his own reputation and eminence. After the defeat of the Perian invasion by the battle of Marathon, an event which interested him, and which he thought into exercise his predominant love of glory, he foretold that the attempt might be renewed by sea as well as by land; and he therefore exerted his influence in rendering the Athenian state a naval power. With this view, he induced his countrymen to appropriate the revenue accruing from the silver mines to the equipment of a number of galleys; and as he posseffed the chief authority at Athens, in consequence of the banishment of Arifides, he found no obstacle to the execution of his design. In the course of three years after this event, the hostile preparations of Xerxes for an expedi-

"Stems racemose. Shreds compressed, broad, sword-shaped, concealing the branches, and the heads of flowers, before expansion. All the heads are originally concealed in the sheath of a leaf."
tion into Greece to enforce the demand of subjection, furnished him with a plea for urging the Grecian states to compromise their mutual differences, and to unite in defending themselves against the invader. In the choice of a general, with whom the command should be intrusted in this emergency, the Athenians favoured the claims of a democratic orator, named Epicydes, who had fascinated them by his eloquence; but Themistocles induced him to surrender his pretensions to an office for which he was totally unqualified by a bribe, and thus secured the appointment for himself without a competitor. When news arrived that the Persian army, conveyed by a fleet, was approaching the istraits of Thermopylae, Themistocles proposed that the Athenians should fit out their galleys and fail to meet them; but this counsel being rejected, he took the command of their troops, and having joined the Lacedaemonians, marched towards Tempé. In the mean while, intelligence was received that the passage of the istraits had been forced, and that Bœotia had submitted to the invaders; and upon this alarm the army returned without seeing the enemy. In these circumstances of apprehended danger, the Athenians, according to their customary practice, had recourse for counsel to the Delphic oracle. The answer, probably suggested by Themistocles himself, was, that they should rely solely on their fleet. It was now proposed, that the city should be wholly abandoned to the Persians, without any attempt for its defence; that the women, children, and aged should be removed to some place of security; and that all who were able to bear arms, should embark on board the galleys, and watch the event. A decree was obtained, after much fruitless opposition, to this purpose; and this was followed by another, which permitted all exiled citizens to return. Arilides was one of this number, who nobly sacrificing, in the moment of his country's danger, all private animosities, concurred in all the spirited measures of his former rival.

Eurybiades, a Spartan, to whom the command of the confederate fleet was assigned, and who was very unequal to the office, differed with Themistocles as to the measures proper to be pursued; and behaved with an incoherence, which, probably for the sake of the public service, the latter did not think proper to reprove. Eurybiades was pacified by the gentleness and self-command of Themistocles, and convinced by his reasoning. Finding it prudent, however, to change the measures which he originally contemplated, he employed a stratagem to induce the Persians to advance and make an attack. This was followed by the famous battle of Salamis, which took place in the year B.C. 480, and which terminated in the signal defeat of the Persian navy. The victory has been chiefly ascribed to the skill and valour of Themistocles; and having thus succeeded, he advised the confederates to fall immediately to the Hellespont, in order to destroy the bridge of boats by which the army of Xerxes had passed over, and thus to intercept his communication with Asia; but being overruled in this proposal, he dispatched a secret messenger to the Persian king, with information that the Greeks intended to break his bridge, and advising him to retreat immediately before the design was executed. The policy of Themistocles, as we may judge from this instance, was not always uniform and consistent; and in another cafe, which remains to be mentioned, on the authority of Plutarch, it was inexcusably flagitious. When the combined Grecian fleet was wintering at Pegasa in Magnesia, he informed the Athenians, that he had conceived a project which would be of infinite service to the republic, and at their desire, he would communicate it to Arilides. This virtuous man told them, that the scheme of Themistocles would be highly advantageous, but that nothing could be more unjust; upon which, very much to their honour, they determined not to adopt it. The plan was to burn all the ships of the fleet, except those of Athens, by which he would remain complete mistress of the seas.

The victory at Salamis advanced the name and character of Themistocles to the highest pitch of glory throughout Greece. On his visit to Sparta, he was received with every token of respect; and whilst the first prize of valour was decreed by the people to their countryman Eurybiades, the olive wreath of superior wisdom was placed on the head of the Athenian; and they also presented him with a magnificent chariot, and ordered three hundred of their youth to attend him back to the borders. At the next Olympic games, the eyes of the whole assembly were fixed upon Themistocles, and he was pointed out to strangers as the most interesting object at the spectacle. Themistocles himself acknowledged, that this was the noblest day of his life. When the constitution of Athens was about to be re-established, after the rebuilding of the city, Themistocles, in conformity to the political principles which he had adopted, proposed that every citizen should have an equal right to participate in the government, and that the members should be chosen from the body of the people, without distinction; and in his proposals the people unanimously acquiesced. He also proposed to fortify the city; but as the Lacedaemonians objected to the proposal, he was deputed upon an embassy to Sparta with a view of conciliating them. He contrived, however, by various artifices, to prolong the negotiation, so that the Athenians had constructed their walls before the Spartans were duly apprized of the fact. Themistocles vindicated this artifice by alleging, "that all things are lawful in serving our country;" and the Spartans, admiring his patriotism, silently acquiesced. In the following year, his scheme for rendering the Pyræum the principal port of Athens, and connecting it with the city by long walls, was adopted and accomplished.

Independently of the deceits which Themistocles had practiced with regard to the Lacedaemonians, another circumstance had occurred which increased their enmity against him. He had successfully opposed their sending deputies to the Amphictyonic council, and thus degraded their authority in Greece. Incensed against him, they joined his rivals at Athens, and used all their influence to destroy his reputation. His own conduct also had excited jealousy and reproof; for he had caused to be erected near his own house a temple to "Diana Arribobule," or "of the best counsel," thus intimating, that his counsels had been the best for the Grecian community. His enemies prevailed, and procured his banishment from Athens by the sentence of Otracism. During his exile at Argos, his enemies gained an additional advantage over him. Apprized of the treasonable designs of Pausanias, the Spartan, against the liberty of Greece, he declined the discomfiture of them; and after the detection and death of Pausanias, letters of Themistocles were found, which proved that they had conferred on this statesman. The Lacedaemonians preferred an accusation against him to the Athenians; and they called him to account in the presence of the states of Greece. Dreading a trial, he fled to Corcyra, and thinking himself secure there, he withdrew to Epirus; and at length was reduced to the necessity of seeking the protection of Admetus, king of the Molossi, whom he had formerly offended. The vengeance of the Spartans pursued him, and Admetus was threatened with a war, if he protected the criminal. The king dismissioned him with money across the continent to a port in the Ægean sea, whence he reached Asia in safety. In the year B.C. 462, he arrived at the Persian court; but here...
his name was so obnoxious, that a reward of 200 talents had been offered for apprehending him. Here he appeared in disguise, and pretending that he had important information which he wished to communicate to the king in person, he was admitted to the royal presence, and favourably received: the 200 talents, which were the price of his head, were paid to himself, and a more ample recompense was offered to him, if he would give useful information concerning Greece. He was granted time for acquiring the Periwan language, and after a year he appeared at court like a native. The king and royal family treated him with distinction; and it is said that the revenues of three cities, viz. Magnesia, Lampacus, and Myus, were assigned to him, under the name of bread, wine and meat; and as some fay, two more, for lodging and wardrobes. In this state of luxury and magnificence he was joined by the members of his family, who had been conveyed to him by his friends, and to them he expressed a kind of satisfaction with his condition, which proves that moral meaness may accompany exalted talents.

The close of his life is involved in obscurity. Plutarch relates, that upon the revolt of Egypt, supported by the Athenians, against the Periwan dominion, the Greek king, resolving to send an expedition into Greece, dispatched him to Themistocles and Magnesia, reminding him of his promises, and claiming the fulfilment of them: upon which it is said, that, in order to avoid the disgrace of bearing arms against his country, after sacrificing to the gods and taking solemn leave of his friends, he drank poison, and died in that city at the age of sixty-five years. Thucydides, his contemporary, says that he died of a distemper; and others again report, that he poisoned himself, because it was not in his power to accomplish what he had promised. The Magnesians honoured his memory with a tumulus tomb; but his remains, according to his own orders, were privately conveyed to Attica, where they were interred. It is further said, that the Athenians, repenting of their treatment of him, raised a tomb for him in the Pyreum, which was an interesting object to all who visited that port. His singular talents, and the services which he rendered to his country, must be acknowledged; and those who think favourably of him, ascribe his defection of them to unjust persecution. But in Themistocles we look in vain for the virtues of an Arilides; and he can only be allowed the honour of a distinguished general and statesman. Thucydides. Plut. in Them. Anc. Unit. Hist.

THEMNA, Timna, or Thannnata, in Ancient Geography, a town of Palestine, in the tribe of Dan. Jos. ix. 43. — Allo, a town of Arabia Deferta, on the confines of Melopotamia.

THEN, in Geography, a river of France, which runs into the Weze, near Frauncemont.

THENA, in Ancient Geography, an ancient town of Africa, situated N. E. of the Tanais and near it, and two miles in circuit. — Allo, a town of Samaria, in the vicinity of Sichem.

THENAC, or THANAC, a royal town of Judæa, in the half-tribe of Manassæch, on this side of Jordan. It was given to the Levites of this tribe, and its king was one of those who were vanquished and slain by Joshua.

THENE, a town of the isle of Crete, near Chiosius.

THENAR, in Anatomy. The eminence in the palm of the hand, formed by the muscles of the thumb, has been called thenar: and some of the muscles have been described under the same name.

The thean of Riolan and Winfulow includes the abductor pollicis brevis, and the opponens pollicis.

THENEATE or Gannin, the Sheep Cliffs, in Geography, mountains of Africa, in Sahara; 90 miles S. of Algiers.

THENEZAY, a town of France, in the department of the Two Sevres; 10 miles N. E. of Martain.

THENG, a town of Germany, which gives name to a principality, situated in the Hegau, bordering on Schaffhausen; 8 miles N. of Schaffhausen.

THENON, a town of France, in the department of the Dordogne; 6 miles N. W. of Montignac.

THENONGOUN, a town of the Birman empire; 4 miles S. W. of Ava.

THENOPSICHITES. See THENETOPSICHITES.

THENSA, among the Romans, a veil or canopy, used in the chariots of games; and likewise to cover a feast of flate. The sale could not be granted to any but by the express allowance of the senate. Hist. Acad. Inscript. vol. 1. p. 379.

THEOBALD, Lewis, in Biography, a professed writer, was the son of an eminent attorney at Sittingbourne, in the county of Kent, and is here noticed as one of the numerous editors of Shakspeare. Of his various works, critical, poetical, and dramatic, it is needless to give any account, as they have sunk into oblivion. He had the misfortune of becoming, to an undue degree, the object of Mr. Pope's contempt and satire, and of having the first place assigned him in the Dunciad, though he was afterwards superceded by Cliber. His edition of Shakspeare was preceded by a work entitled "Shakspeare restored," and published in 1726; and also by that of Mr. Pope. It is thus characterized by Dr. Johnson: *Pope was succeeded by Theobald, a man of narrow comprehension and small acquisitions, with no native and intrinsic splendour of genius, with little of the artificial light of learning, but zealous for minute accuracy, and not negligent in pursuing it. He collected the ancient copies, and rectified many errors. A man so anxiously furipulous might have been expected to do more; for what little he did was commonly right." Of the tragedy which he brought on the stage, and which is entitled "The Double Faithless," the greater part is ascribed by him to Shakspeare; but Dr. Farmer has proved that this is a mistake.

THEOBROMA, in Botany, the Chocolate-tree, received that name from Linæus, who probably, like the prudent Bacht, cited by De Theis, was fond of the delicious produce of this tree; for the word is formed of θεός, a god, and βρωμα, food. A French writer, M. Tuiliez, in his magnificent Flora des Antilles, has objected to the above generic name, for a reason which we confess has been one of the last we should have thought of; that it carries with it the signification of a quality, and seems therefore more fit for the name of a species. Surely nothing can be more desirable than a generic appellation which conveys information; on which account Amarantus, Artocarpus, Biferrated, are excellent; we need not run through the botanical alphabet in search of numerous others. Such probably was the origin of most names, in every language, and who can tell that the American word Cassia, substituted, or rather restored, by Tuiliez, may not express some quality of the plant? Neither is it an objection to any significative generic names, that they express merely some general property or peculiarity, not found in every one of the species, witness Urtica. The idea of stinging is associated with the name of a Nettle; like redsnefs with that of a Rose; though there are Dead Nettles, and White Roses. — Linna. Gen. 391, with an erroneous description, corrected in Linn. Suppl. 341. Schreb. 513. Willd. Sp. Pl. v. 3. 1422. Mart. Mill.

Gen. Ch. Cal. Perianth inferior, of five ovato-lanceolate, acute, spreading, coloured, deciduous leaves. Cor. Petals five, rather longer than the calyx; their claws dilated, concave, hollowed, marked internally with two ribs from the base, and one from the summit: their borders roundish-ovate, pointed, spreading, each contracted at the base into a narrow, erect and recurved stalk, connected with the claw. Nectary short, cup-shaped, crowned with five long, erect, awl-shaped, pointed, equal, converging segments. Stam. Filaments five, thread-shaped, erect, recurved at the upper part, concealed in the hollow claws of the petals, invested into the outside of the nectary between its segments, but not above half so long; anthers two to each filament, (one on each side, at the summit,) vertical, two-lobed, one lobe over the other. Pist. Gemen superior, nearly sessile, ovate, with five furrows; style cylindrical; stigma in five awl-shaped segments. Peric. Berry elliptic-obleng, beaked, coated, of one cell. Seeds large, ovate, smooth, numerous, in five rows: their cotyledons in many deep lobes.


Obf. Gertner observes that he could find no traces of the five cells attributed by authors to this fruit. It is probable, however, from analogy, that they may exisit in the germin, and Aublet’s account is sufficiently explicit of their presence in the fruit. The drawing in the Linnaean herbarium, which appears to have been lent by Allamand from the West Indies, has led us to suppose each filament bore four anthers; but it seems there are only two, each of two round, distinct, vertical lobes, as represented by Aublet, t. 275, and copied by Lamark. The order of Decandria must therefore be restored in the clas Polyadephia. See Sm. Intr. to Bot. ed. 3. 340. Linnaeus’s characters of Theobroma in Gen. Pl. were taken chiefly from Plumier’s Guasuma, the Bubroma of Schreb. Gen. 513; see that article. He has left a more correct description in manuscript, from which perhaps his son compiled what is given in the Supplementum. From these sources, with the help of Allamand’s drawing, and what is to be found in Aublet and Schreber, we have drawn up our account, having no opportunity of examining a flower.

1. Th. Cacao. Smooth-leaved Chocolate-tree. Linn. Sp. Pl. 1100. Suppl. 341. Wildt n. 1. Ait. n. 1. (Th. n. 2 and 3; Browne Jam. 326; Caco; Merian. Surin. t. 26 and 63. C. Theobroma; Tuffac Flore des Antilles, t. 13. Arbor cacaoe americana; Pluk. Almajag. 40. Phyto. t. 268, f. 3.)—Leaves entire, smooth on both sides. —Native of South America. Aublet appears to have had this plant alive at rhelea, but it has never long succeeded in our flowers; being extremely tender, even in some parts of the West Indies. Browne fays the Chocolate-trees, though naturallyized in the woods of Jamaica, are very delicate, and rarely survive when once they are loosened in the ground by hurricanes. (See Chocolate.) Thee trees are the size of a middling apple-tree, but seldom exceed fix or seven inches in diameter. They are very beautiful, especially when laden with fruit, which is dispersed, on short stalks, over the stem, and round principal branches; its yellow hue and warty surface somewhat resembling a citron. The leaves are alternate, flaked, drooping, a foot long, and three inches broad, elliptic-oblong, pointed, entire, slightly wavy, very smooth on both sides, with one mid-rib, and many transverse ones, connected by innumerable, minute, reticulated veins. Footstalks round, hairy, an inch long. Stipulas minute, deciduous. Flowers small, several together in tufts, at the sides of the branches, on simple stalks, only one in each tuft, commonly producing fruit. Calyx light rofe-coloured. Petals yellow.

2. Th. guianensis. Downy-leaved Chocolate-tree. Willd. n. 1. Ait. n. 1. (Caco guianensis; Aubl. Guian. v. 2. 683. t. 275.)—Leaves wavy, and somewhat toothed; downy beneath.—Native of marvhy woods in Guiana, bearing flowers and fruit in September. Of rather more humble growth than the foregoing. The leaves are, at most, but eight inches in length, and three in breadth; their margin wavy, or rather bordered with fhalow teeth, towards the extremity; their upper surface smooth and green; the under clothed with short, ash-coloured, or rufy pubescence, and reticulated with fine veins. Footstalks short, channelled, downy. Flowers situated like the former. Calyx green without, yellow within. Petals yellowish. Fruit elliptical, with five angles, and clothed with short rufly down. Aublet fays it has five cells, separated by membraneous partitions; the seeds enveloped in a gelatinous, white, melting substance; their kernel white, very good eating when fresh. He speaks of this species as the Chocolate of Guiana, though he mentions a Cacao sativa, with entire leaves, as a cultivated kind, under which he cites Theobroma Cacao of Linneaus, and its acknowledged synonymes.

Aublet has also a Cacoa sylvatica, v. 2. 687. t. 276, with entire leaves, downy beneath, and a downy fruit, without ribs. Willdenow afferts, we know not on what authority, that this last is Duroia Eriopila, Linn. Suppl. 209, of which we, unfortunately, have met with no specimne. A branch of Aublet’s plant, communicated from his own herbarium by sir Joseph Banks, appears a variety of the last, its leaves being obscurely toothed in a similur manner; but for want of flowers we cannot say how far it answers to Duroia, between which and Theobroma there is no affinity in that respect. Aublet clearly describes his as a Theobroma, and we cannot help suppecting some error in Willdenow, as well as, possibly, a disagreement between Aublet’s figure and our above-mentioned specimne, which latter may be, as above hinted, his Cacoa guianensis. At any rate, the two species of Theobroma which we have described, are certainly and permanently distinct.

Theobroma, in Gardening, contains a plant of the exotic tree kind, of which the species usually cultivated is the chocolate nut-tree (T. cacao).

In its natural state, this tree produces a nut or fruit which is smooth, of a yellow, red, or of both colours, about three inches in diameter; it has a sleeky rind, near half an inch in thickenes, which is flesh-coloured within: the pulp being whitish, of the consistence of butter, separating from the rind in a state of ripeness, and adhering to it only by the filaments, which penetrate it, and reach to the seeds. Hence it is known when the seeds are ripe by the rattling of the capsule when it is shaken: the pulp has a sweet and not unpleasant taste, with a slight acidity; it is sucked and eaten raw by the natives; it may be easily separated into as many parts as there are seeds, to which it adheres strongly, and they are wrapped up in it, so that each seed seems to have its own proper pulp: the seeds are about twenty-five in number: when fresh, they are of a flesh-colour: gathered before they are ripe, they preserve them in sugar, and thus they are very grateful to the palate: they quickly lose their power of vegetation, if taken out of the capsule, but kept in it, they preserve that power for a long time: the tree
bears leaves, flowers, and fruit all the year through; but
the usual feasons for gathering the fruit are June and De-
ember: in two years from the seed, the tree is above three
feet high, and sproads its branches, not more than five of
which are suffered to remain. Before its third year is com-
plete, it floews for fruit; a tree yields from two to three
pounds of feed annually. Such trees are of oue rod very
productive.

Method of Culture.—It is increafed by feed obtained from
abroad, fowing it as foon after its arrival as poffible, in pots
filled with light earth, and fpringing them in a hark-bed,
where they will foon come up; and when the plants are
about three inches high, putting them off Separately, and
replunging them in the hark-bed in the flove, managing
them as other woody exotics of the flove kind afterwards.
They afford an agreeable variety in feed collections.

This tree is cultivated to coniderable extent, and with
very great attention in its native situations in the hot parts of
America, for the fake of its fruit, the kernels of which are
much ufed in the making of chocolate there, as well as in
this country. In this intention, they are firit brought to a
pulverizable flate by drying or roafting in a proper appar-
ratus; they are then reduced into a fine powder by mills or
other contrivances; after which, this fine powder is wrought
up into a paste with orange-water, milk, and other liquids,
and has fugar, different sorts of aromatic spices, and some
aromatic perfumes, mixed and incorporated with it, when
it is formed into cakes, or made into pretty large rolls, for
exportation and fale in the European and other markets, if
prepared in the places of its native growth.

It is employed somewhat in the manner of coffee as a fine
rich breakfast article of diet, and ufed very extensively for
that purpofe in this and other countries.

THEOCITAGNOSTÆ, formed from Θεος, God, and καταγνωσθαι, I judge, or condenfa, a feat of hereticks, or
rather of baffambers, who prefumed to find fault with cer-
tain words and actions of God, and to blame many things in
the Scriptures.

Marshall, in his Tables, places these hereticks in the seven-
th century; for what reafon we know not. Damafeenus is
the only author that mentions them, but without taking any
notice of the time of their appearance.

THEOCRACY, formed from Θεος, God, and κράτος, power, empire, a feat governed by the immediate direc-
tion of God alone.

According to Josephus, the ancient government of the
Jews was theocratic; God himfelf ordering and directing
everything belonging to the fovereign authority.

By the oracle of Jehovah himfelf, all laws were enacted,
war was proclaimed, and magiftrates were appointed; in
which three particulars the fana praecipuæ, or fovereign
authority, of any flate, confift. And as Jehovah was the
king, as well as the God of Israel, the priests and Levites,
who were the flated attendants on his preence, and to whom
the execution of the law in many cafes was committed, were
properly minifters of flate and of civil government, as well
as of religion. The facrifices alfo, becide their religious
ufe, were intended for the support of the flate, and civil
government.

This theocracy failed till the time of Saul; when the
Israelites, weary of it, defired they might have a king
like other nations; and thence forward the flate became
monarchic.

There was also a kind of imaginary theocracy at Athens:
while the fons of Codrus were difputing the fucceffion, the
Athenians, wearied out with the trifleries of an interself war,
abolished the royalty, and declared Jupiter the only king of
the people at Athens.

THEOCRITUS, in Biography, a Greek poet, exalted
as the model of pastoral poetry, was a native of Syracuse,
and the fon of Praxagoras and Philina. The time in which
he flourifhed is aetcertained by two of his poems, one ad-
rected to Hiero, king of Syracuse, who began his reign
about the year B.C. 265, and the other to Ptolemy Phi-
ladelphia, whose reign comprehended the interval be-
tween 281 and 246 B.C. Although Hiero is reported to
have been a patron of literature, perfons of rank, as
we may infer from Theocritus's poem, did not fol-
low his example, at leaft in granting encouragement to
poets; and therefore Theocritus left Sicily, and vifited
the court of Ptolemy Philadelphia at Alexandria, on
whom he pronounces a splendid eulogy. The compositions
of this poet are denominated "Idyls;" they are written in
the Doric or rustic dialect, and few of them are pastoral
poems, though not of them relate to rural life and manners.

The purely pastoral are diftinguifhing by the truth and fimplicity
of the manners, defcribing sometimes even to cardinals, and
the pleafing defcription of natural objects, drawn from the
life. To thofe who have a taste for genuine fimplicity,
and the beauties of nature, fays one of his biographers,
the poetry of Theocritus is highly agreeable. The moft
exhufed editions of his works, are D. Heinifus's,480. Com-
mel. 1604; R. Wett's, Oxon. Svo. 1699; Th. Warton's,
Oxon. 2 vols. 4to. 1770; Valkenier's, cum Bione et Moff-

THEODOLITE, or THEODOLET, is an instrument
used for measuring horizontal and vertical angles in
land-surveying. This instrument was at first made on a small
portable fcale, supported by a tripod that would put up into
the form of a walking-flick, when the mechanism of brafs-
work is difmiffion; and the flate of dividing circles is
now brought to that perfection in England, that small port-
able theodolites are fit for use among land-surveyors, who
confine themselves to the planning of single fites, for
which these instruments are competent; but for surveys on
a large fcale, fuch as county surveys, or trigonometrical
measurement of diftant fhips, theodolites of an enlarged
conftitution have been ufed with confiderable advantage.
Out of the numerous modifications of this instrument, that
different artifls have contrived, we propofe to defcril two
for particuJar decription, which are generally confidered as
the felf for accurate surveys; one by Ramfden, and the
other by Troughton. We will begin with that large in-
strument already referred to in a former article, which was
made by Ramfden, in the year 1777, for the fufe of general
Roy, when he undertook his grand trigonometrical opera-
tions, and which is defcribed in the 8th vol. of the Phi-
losophical Transactions of London (1752), with all the
conftant parts given separate in four large plates.
A fimilar instrument, by the fame maker, has since been
ufed for the grand general survey of the different coun-
ties, by Meffrs. Mudge and Dalby. Plate VIII. fig. 1.
of Surveys, fhews the perfpective view of this master-
piece of workmanship, nearly as repreffed in gen-
eral Roy's third plate; but his account, having reference
to thefeveral plates, will not answer our purpofe.
The flat on which the instrument is placed for fufe, is a four-
legged mahogany fpool A B C, braced as seen in the figure,
with an octagonal top perforated at the centre by a hole
of nine inches diameter. This fpool or fland, when ufed,
hafs its feet screwed fast to the tops of four piles driven into
the ground, and nicely levelled, before the instrument is
placed
Upon the Hooke's may hung which fills it was quarter ufual, cone, and, which we may it is served by the plumb-line to the mark or hole under the instrument may require, for the exact place of the station, over which the centre of the instrument must be exactly fixed. The four horizontal screws of adjustment, of which three are seen at F, F, and F', carried by the board D E, are so contrived as to effect this adjustment by pressure against the edge of the stand, after which the two octagonal boards are made fast together by the said four vertical screws not shown. The upper octagonal D E has an open conical socket of brass, three inches in diameter, in its centre. Next above the board D E, thus adjusted and secured, comes the third board, which is circular, and which forms the base of the instrument. In the centre of this base another brass conical socket, three inches and a quarter in diameter, is made fast, and slips over the smaller conical socket of the board D E of adjustment for central position, so that the centre of the instrument being concentric with this board partakes of the adjustment, while the plumb-line defends through both sockets down towards the ground. The large mahogany circle G H, of more than three feet in diameter, is supported by several pillars connected with the circular board, which we have called the base of the instrument, and forms with them a bafufrade, that protects the instrument, as seen in the figure. A brass circle of three feet diameter, within the bafufrade, is attached by ten strong conical radii to the large vertical hollow axis, formed into the frustum of a cone, of twenty-four inches in height above the metallic wheel, which we shall in future denominate the graduated circle, when considered with its radii and hollow axis attached to it. This axis, by way of distinction, may be called the exterior axis; it has a collar of cast-steel driven fast into the cavity of its inferior or thicker end, and a plate of bell-metal, with a sloping edge, furnishes the superior end, which plate may be raised or lowered by means of five screws acting vertically. The instrument stands on three short feet near D and E, and at an equidistant point not seen behind, which feet are firmly united together, at the place where they branch off, by a circular strong plate of bell-metal, upon which is carried an attached vertical cone of metal smaller than the former one, and as it fills the cavity of the other, we will call it the interior conical axis; the exterior one being moveable round the interior one without the least perceptible liberty, beyond what is necessary for rotatory motion. On the vertex of this interior axis is inserted a cast-steel pivot with sloping cheeks, which, entering the central hole of the bell-metal plate, exactly fits its checks there, while the bell-metal base of the interior axis fits the cast-steel collar inserted into the lower extremity of the exterior conical axis. This mode of centering allows the wheel to be taken off and put on without injury, and is also free from the objection that applies to those large instruments that have the superior end of the vertical axis supported in a frame that is liable to alter in its dimensions by exposure to the sun; of which imperfection, as we have noticed in our article Circle, Piazzi had great reason to complain. Besides, this kind of centre-work allows of carriage from one place to another, without any danger of injury being done to the instrument when properly packed. There are two achromatic telescopes with double object-glasses of each thirty-six inches focus, with eye-pieces of different powers both for erect and inverted positions. One of these telescopes lies across the body of the instrument, with the ends seen between the opposite pillars of the bafufrade, the use of which is to watch the position of the instrument during the time of an observation being made; and, therefore, it requires but little elevation in altitude: the other is mounted, exactly like a transit-instrument, over the top of the exterior vertical axis, and has a semi-circle attached to the extreme end of its horizontal axis of motion, of six inches radius, and graduated for flowing angles of altitude or of depression. The Y's in which the pivots of the upper telescope move, are supported by the horizontal bar I K, which is braced by the ladder-pieces attached to the thick part of the exterior conical axis, and made fast to the top of this axis by its socket, as seen in the section in fig. 4; which section exhibits moreover the internal fittings of both the internal and external axes at their superior ends. This upper telescope has a spirit-level with the usual adjustments at the Y's, and at the bar of suspension for the horizontal position; and, as it will revolve in the Y's, and has moveable wires in the focus of the eye-piece, it may also be adjusted by a horizontal mark for collimation, and for taking exact altitudes, (as well as for taking minute angles of elevation without the semi-circle by the motion of the micrometrical wires,) when the level is applied to a rod on the side of the tube, as is the case in our drawing. When these adjustments are made, by dividing the errors between the proper screws, as usual, the level is hung to the cross-bar I K to watch its position while this telescope is used, and when both telescopes continue to effect the same distant point during an observation, with the bubble of the level in the middle, it is a proof that the instrument keeps its position. When a star or other object is viewed by night, the illuminating lamp K throws light into the axis of the telescope, which has a diagonal perforated reflector, as is usual in transit telescopes. A system of darkening prisms is also applied to the same end of the axis to regulate the quantity of light that shall come to the eye. All these adjustments and appendages have been minutely explained under our articles Circle and Transit-Instrument, and therefore need not be detailed in this article; but it may be proper to observe, that the semi-circle has a moveable clamping-piece, bearing the flec arbor of a vertical screw, the lower end of which falls on a polished piece of steel on the plane of the horizontal bar I K, the use of which clamp and screw is not only to give a slow motion in altitude, but to allow the preponderating eye-end of the telescope to rest steady thereon, while the observation has been read and repeated. The observation in altitude is read by the compound microscope at I, which is nine inches long, and which, by means of its micrometrical screw, reads the divisions of the semi-circle to the accuracy of 5", when an allowance of 12" is made for excentricity. When this theodolite was first brought into use, it was found that the screw L, with an ivory thumb-piece, moved the circle in azimuth by jerks, on which account the apparatus for flow motion, seen in fig. 2, was substituted, in which two crown-wheels and a Hooke's joint are introduced to give motion to the tangent-screw; which addition not only remedied the jerks, but allowed the observer to reach the handle while his eye remained at the upper telescope. The large brass horizontal circle is divided into quarters of a degree, and the subdivisions are made by the vertical micrometrical microscopes, the divided heads of which read exact seconds, when properly adjusted for zero, for
for distinct vision, and for power. The screw of the vertical micrometers has seventy-two threads in the inch, and the notches that indicate the fifteen minutes on the micrometrical scale of feet, are formed by this screw, which we mention particularly, because this mode of reading was probably an original mode, though now become common. These vertical micrometers, G and H, have each a flag, represented by Plate IX. fig. 4; and a dot made on a thin flip of gold, called a gold tongue, lies under the object-lens in such a situation, that the capstan screws can adjust it to a given place in the field of view of each microscope, so as to become a mark for making the adjustments by, and for bisecting the circle at reversed opposite readings. The position of the three glasses of each microscope is seen in fig. 3. of the same plate, together with the magnified appearance of the notched scale and divisions of the circle. In fig. 5, the general plan of the micrometer is exhibited, and in fig. 6, is the plan of the flag where the pillars enter, that support the microscope. Fig. 7, shows the lower or fixed slide, and fig. 8, the upper or bras slide, that separate the wires of the micrometer; while fig. 9, is a representation of the long horizontal microscope that reads the divisions of the semi-circle above noticed, at the letter I in the large figure of Plate VIII. As it was not easy to describe the construction of the three feet, two of which, we have said, only are visible, opposite to D and E, we have added figs. 3. and 5. in Plate VIII. to illustrate their position. In fig. 3. the piece F F, as before, is a portion of the and D E a portion of the octagonal board, to which the screw F is attached, that presses against the angular corner of the fland, into which a piece of brass is let for the screw to press against, an end section of which is shown in fig. 5., with the same letters of reference to the same parts: M N is a section of the base of the instrument, and O one of the three bras branches that bears the foot-screw P, and its two side screws or tightening screws Q, R, as seen in fig. 5. At S is a curved piece of box, fast to MN, which bears the principal part of the weight laid on this screw, and does not gall the parts on which it slides, when a circular motion is given; but, to take off a part of the weight, a cylindrical roller near S is put to a horizontal spring bearing the central pin of the roller, which pressing the roller even with the face of the curved block of box, and may be made to take more or less of the weight by a screw pressing upon it from above, and giving it more or less tension. Hence all the parts of this large instrument are strong, and yet the moving parts are made to go freely and smoothly; and the only alteration that can apparently be made for the better, is the addition of a third vertical microscope, for which the construction is peculiarly adapted; for each branch of the triple bar that carries the three feet, being braced firmly, is made as though each was intended to have a microscope over it, which is the case with only one; and an additional foundation for the second stage is made to receive the second microscope, as we think, unnecessarily; for if three equidistant microscopes have been used instead of two opposite ones, not only would the errors of division and of eccentricity have been lessened thereby, but in the reversed position new parts of the circle would have been pointed to, equidistant from the former three, so that six portions of the circle would thus have been employed in measuring a reversed observation, which the present astronomer royal first pointed out to be an advantage peculiar to three readings on a horizontal circle. We have been informed, that it is yet intended to have three microscopes attached to the horizontal circle of this large instrument, to be used as we have here suggested. For the advantage of a triple reading, see our table for three verniers in the article CIRCLE.

After having given a description of Ramden's great theodolite, we proceed, in the next place, to explain how its different adjustments are made, for putting it into a state proper for use, which we cannot do better, than by adopting the directions laid down by general Roy himself.

The Adjustment of the Axis Level.—The axis of the upper or transit telescope, being brought over any one of the feet, and the circle being clamped, hang the axis level on the pivots, or axe of the telescope, and bring the bubble to the two indices; then reverse the level, that is, turn it end for end, and note the difference. Bieft this difference, one half by the level's adjusting screw, and the other half by that foot-screw only which is in a line with the axis. This operation being repeated until the difference wholly vanishes, the level will be truly adjusted, that is to say, the bubble will rest between the same points in both positions.

Adjustment of the Elevation Level.—This level being suspended on the rod attached to the outside of the transit telescope, screw the erect eye-tube on, to make that end preponderate. Adjust the bubble to the indices by the fixed finger-screw at the tail of the semi-circle's clamp, reverse the level, and note the difference. Then bieft that difference, and correct one half by the finger-screw, and the other half by the proper adjusting screw under the level, and so on, repeatedly, until the difference wholly vanishes. The level may then be hung on the two pins that project from the horizontal bar which carries the telescope, where, being parallel to the axis level, it will lie, when that is removed (as is commonly the case when terrestrial objects only are observed) whether the plane of the instrument suffers any alteration. If this should have happened, the level on the horizontal bar is at all times sufficient to correct it.

To set the vertical Axis perpendicular.—This may be done by either level, but best with the axis level, which, being suspended on its pivots, must be brought parallel with two of the feet of the instrument; and by the screws of these two feet, the bubble is to be brought between its indices. The circle being then turned round 180°, if the bubble changes its place, half the difference is to be corrected by one of the feet-screws, and the other half by two capstan-headed screws, that adjoin each other, under and belonging to one of the Y's, or supports, in which the pivots rest. When the bubble is found to be just in these two positions, turn the circle 90°, which will necessarily bring the axis over the third foot of this instrument; then correct any error there may be by that foot-screw. In this manner the circle will be made to revolve again and again, without any alteration whatever of the bubble, which shows that the vertical axis is then truly perpendicular to the horizon.

To make the Line of Collimation in the Telescope at right angles with the transverse Axis. The pivots resting in their Y's, direct the telescope to some distant well-defined object, and let the circle be clamped. Then reverse the axis, that is, turn the telescope upside down. If the interference of the wires does not coincide with the object in both positions, half the difference must be corrected by the motion of the circle with the Hook's joint, and the other half by the motion of the brass slide in the eye-end of the telescope, by applying the milled-head key in the small socket-rod in the figure; and so repeatedly until the difference wholly disappears.

To set the Rod on which the Elevation Level hangs parallel to the Line of Collimation.—The vertical axis being supposed to be
THEODOLITE.

When nearly vertical, hang the level on its rod, and rectify the bubble by the finger-screw of the clamp. Set the horizontal wire on the heel slide, to intersect the centres of the oblique wires, and place the dart or index at zero on the micrometer head. Then observe some distant distant object by the horizontal wire. Invert the semi-circle, that is, turn the azimuth circle 180°, and the telescope upside down, so as to bring the wire upon, or nearly upon, the same object. Now, if the level be not right, rectify it by the finger-screw at the tail of the clamp. If the telescope does not now accurately cover the same object, as in the former position, differ the difference by the finger-screw of the clamp, and then rectify the bubble by the capstan-nuts under one end of the rod. Repeat this operation until the level is right, when the telescope sees the same object in both positions, and thereby the rod will be brought parallel in altitude to the line of collimation, or axis of vision.

We have described other and more recent constructions of large circular instruments, under the word Circle, that have all the properties of the theodolite which we have here described, and some of which have the advantage of a large vertical circle, that renders their use in astronomy co-extensive with their application to geodetical operations, and which therefore we recommend in preference to the bulky instrument with which the English trigonometrical surveys were performed.

A theodolite of a portable size, and of Troughton's best construction, is exhibited in Plate IX. fig. 1. of Surveying, such as is adapted for land-surveying, or for the surveying of harbours. A, B, C, are the three mahogany legs of a tripod, furnished with brasses joints which allow the legs to form one entire cylinder, about four feet long. The brasses-work above the three joints has a male screw, upon which a socket, under the brasses circular plate D E, fence, and bears the instrument, which is almost entirely of brass. This plate D E has four sockets made fast into it, projecting both above and below, as seen in the figure, in which are exhibited three out of the four, with as many screws with milled heads, that ascend and descend as they are turned round, forwards or backwards, by means of their connection with their respective sockets, that have each a female screw: the heads of those screws press against the inferior face of the upper circular brasses plate F G, to which a ball, ending with a vertical axis, is attached, and is embraced by the upper portion of the socket of plate D E, within the four screws. The intention of the ball and socket, and of the two plates with the four intervening screws, is to place the axis of the ball in a vertical position, and to keep it in that position while the parts above are employed in making an observation; which office this mechanism will perform on sloping as well as on level ground. The axis of the ball, however, is made hollow, to admit of a smaller solid axis within it, and has also two sockets or tubes surrounding it; all which have separate motions, when the ball is made fast by the prehure of the four screws. The inner tube is attached to the graduated circle L M, of eight inches diameter, the chamfered edge of which circle is solid silver, that receives the dividing looks read by the microscope K; and the clamping piece, keen separately m fig. 2, will fix the said tube and graduated plate in any given situation by means of the screw F, after which the screw G with the milled head, attached to the plate F G, will produce the flow motion when necessary. The lower telescope H I turns on two pivots not seen, one of which pivots has its hole in a cock, borne by a smaller circular plate under the graduated plate, into which the two screws H and I enter, and the other pivot enters the outermost tube; so that an elevation or depression of about 20° can be effected by this telescope, before its motion is limited by the superior and inferior plates. This telescope has a proper motion in azimuth, independently of the graduated plate, which motion is produced by the thumb-screw H, the head of which has a pinion acting with a concealed wheel made fast to the graduated plate; but when the clamping-screw I is made fast, then the telescope and graduated plate have but one common motion, which is commanded by the tangent-screw G of the clamping-piece F G.

The use of the separate motion of this telescope will be explained presently. Above the graduated plate L M, and in close contact with it, the vernier-plate revolves with the solid or innermost axis, that is fast to it, and its clamp and screw of flow motion are hid from the light by the superincumbent frame. This plate, which has four opposite verniers, each reading to the accuracy of 1°, will move separately, or may be clamped to the graduated plate, as occasion may require. Upon the plane of this vernier-plate, two spirit-levels are placed with their proper adjufting-screws, one of which is seen at N; but the other, which stands at right angles to this, is concealed in the drawing by the framework. A compass and magnetic needle are also concealed within the frame, but may be conceived to be concentric with the vernier-plate within the shaft frame. The tail-piece of the revolving microscope K fits into a circular groove under the graduated plate L M, and, without having a centre of motion, will slide along the groove into any of the four positions, where the verniers require to be read, without interfering with any of the other motions. The instrument now before us has been some years in use, and is drawn on an enlarged scale, that all the parts may be the better described; but the most recent theodolites of this construction have only three verniers, in preference to four, by reason of the property, which this number has, of measuring at five different and equidistant points on the graduated limb, when the measurement of an angle is repeated in a reflected position of the superior telescope; so that whatever errors of eccentricity or of graduation may exist in the horizontal circle, they will be made to vanish, in a great measure, by their counteraction in the reversed position of the verniers. Upon the plane of the vernier-plate is fastened, by three screws, forming an isosceles triangle, the frame which supports the pivots of the horizontal axis of the semi-circle F Q, on which the upper telescope T U is placed. The arm, which bears the microscope O for reading the altitude or depression measured by the semi-circle, has a tube that slides upon the projecting horizontal axis, that allows of some degrees of motion between the end-bars of the frame; and another arm, that clamps the opposite end of the said axis, has a tangent-screw of flow motion at R, which fixes the final contact of the intersecting point of the spider's lines, within the eye-end of the telescope, with the object viewed. The vernier for the semi-circle is fastened to the frame, after spanning over the compass-box; and its exact place may be adjusted by the screw of the frame above M, which stands at the apex of the isosceles triangle formed by the three screws. The level, that is seen under and parallel to the upper telescope, is attached to it by two pairs of screws, one pair of which adjoins for the elevation or depression of one end of the tube that holds the bubble, and the other pair adjoins laterally for true parallelism in this respect: when the pins T and U are removed, the upper semi-circle of each ring, V and W, will turn back each on a hinge, and allow the telescope to be taken out of its Y's, for the purpose of being revered in position;
position; and in both situations the telescope is capable of having a circular motion, that carries the attached level round with it an entire revolution. During this revolution, an eye observing the intercrossed point of the field of view, as projected on a distant point, will see whether or not any adjustment of the spider's lines is necessary, and in what respect. The aperture of each telescope is an inch and a half, and the ordinary magnifying powers are from ten to eleven, with nearly fourteen inches of tube; but the upper or measuring telescope has a second eye-piece of the positive kind, which produces a magnifying power of twenty times. There are three spider's lines in each eye-piece, one horizontal, and two crossing it so as to include a small angle between them; which method of fixing the lines, allows the observer an opportunity of bisecting the said small angle by a vertical staff erected at a distance, which is better than covering the staff with a vertical line, that would disappear upon the plane of such staff. Before we proceed to explain how this theodolite is used in the field, it will be requisite to shew how the previous adjustments are to be performed.

When the instrument is screwed to the head of the tripod, the legs must be opened wide enough to ensure a firm position, and the points must be pressed into the ground equally, exactly over the hole into which a staff or staff has been, or is intended to be, inserted; so that the plumb, suspended from a pin at the junction of the legs, will fall exactly upon the said hole; in which situation the staff, marked $\mathcal{C}$, is said to be taken.

When the theodolite has been properly fixed in its station, the first adjustment that will require to be made, is that which regards the line of collimation. When all the parts of the instrument are properly in their places, let the upper telescope be pointed in a horizontal line, that passes over two of the four screws of plate $D\,E$, and note what point in a distant object is covered by the horizontal spider's line, near the middle of the field of view; then turn the telescope half round in the Y's, till the level lies above it, and observe if the same point is again cut by the said line; if not, elevate or lower the horizontal line by the proper screws in the eye-piece, releveling one and screwing up the other, till the distance between the two points, corresponding to the two positions, is bisected by the horizontal spider's line: and if, when the telescope is turned back to its original position, with the level under it, the spider's line covers the point adjusted to, the line of collimation in altitude or depression will be correct; but if not, the operation must be repeated delicately, till the horizontal line covers the same distant point in both positions. The same operation will also put the vertical line correct, or rather the point of interjection, when there are two oblique lines instead of a vertical line, as in Troughton's theodolite; and the adjustments will be known to be complete, when the point of interjection continues on the same distant point, while the telescope is made to revolve round the line of collimation as an axis.

The second adjustment is that which puts the long level parallel to the rectified line of collimation. While the telescope remains parallel to the line that joins two opposite screws of plate $D\,E$, adjust those two screws by turning them in opposite directions, until the bubble is observed to be in the middle of its tube under the telescope: then, the semi-rings V and W being previously turned back, reverse the ends of the telescope, and also of the level attached to it; and if the bubble will reimburse its former situation in the middle of the tube, both the line of collimation and the level will be truly horizontal, and consequently parallel to each other; but if the bubble recedes to one end, bring it back one half by the screws that elevate or depress one end of the level, and the other half by the screws of plate $D\,E$. Let this operation be repeated till the bubble will remain in the middle of the tube, after the telescope has been reversed into both positions. The adjustment of the level, however, is not yet complete; for though the axes of the two tubes may be equidistant at both ends of the level, yet may they be inclined so as to form an horizontal angle with each other at some distance, and in this case the bubble will run to the higher end of its tube, when the telescope rotates; there are therefore two lateral screws, which adjust the parallelism of the two tubes, so that the bubble will remain in the middle, in every part of a rotation of the telescope round its line of collimation, which adjustment must now be made; and if this lateral adjustment should be found to derange the vertical one before made, it must be re-adjusted, and the level will then be in a proper plate for use, provided the Y's are alike, and also the cylinders that rest in them; but if not, the bubble will not rest in the middle in both of the reversed positions, till they are made so.

The third adjustment that we propose to explain, is that which puts the line of collimation exactly at right angles to the axis of the semi-circle's vertical motion, which has not yet been described, but which is essentially necessary to be attended to, more particularly by the maker. Let the upper telescope be directed to some horizontal well-defined mark, that is included within the angular space formed by the two oblique lines, just where the vertical line would have been, if such line had been used, while zero of the vernier coincides with zero (360°) of the horizontal limb of plate $L\,M$; then all the screws being fast, except the one which allows the vernier-plate to revolve, turn 180° in azimuth, and reverse the telescope by taking it out of its Y's, into its original position with respect to the mark; and if this is seen in precisely the same situation in the angular space, (though not perhaps with respect to altitude, if the axis of the vernier-plate was not previously adjusted,) the line of collimation will be at right angles to the axis of the vertical motion; but should this not prove to be the case, one of the Y's will require to be altered laterally, but the adjustment of the level will not be deranged thereby. This alteration of one of the Y's had, however, better be effected by a regular workman, and should never be neglected by the maker.

The fourth adjustment, which might have preceded the third without inconvenience, is that which makes the common axis of motion of the vernier-plate and horizontal graduated circle truly vertical. This is done partly by the screws that fix the ball and socket, inflected into plate $D\,E$, and partly by the adjusting-screw R of the vertical semi-circle. Hitherto the upper telescope has lain over two of the four screws only, and in a horizontal line, with the bubble in the middle. Let it now be turned along with the vernier-plate just 90°, till it lies over the other pair of opposite screws, and see if the bubble be now also in the middle, if not, make it so by those screws; and if, after this operation, the bubble will remain in the middle during a whole revolution of the vernier-plate, in both the reversed positions of the telescope, the vertical axis of motion will be truly adjusted.

The fifth adjustment relates to the levels fixed to the plane of the horizontal graduated circle, which are useful in watching the horizontal position of the instrument, while an observation is making; these, which are at right angles to each other horizontally, must also be separately at right angles to the vertical axis that carries them round. When this axis has been adjusted, as we have just explained, by the level of the upper telescope, the bubbles of both
the fixed levels must be brought to the middle of their respective tubes by their proper screws, so that the bubbles of all the three levels may remain stationary in every part of the revolution of the vernier-plate, which they will do if its axis is truly vertical.

The fifth adjustment is that which puts the axis of the semi-circle's motion truly horizontal, or at right angles to the vertical motion of the horizontal circles; this is known to be so, when the point of interection of the spider's lines will cover a long plumb-line, suspended at a distance, as the angle of elevation increases, from the inferior to the superior end of the suspended line; and will better by trying if the pole star, and its reflected image, seen in a biface or quick-fiver, will be successively covered by the said point of interection of the spider's lines. In some theodolites, the horizontal axis lies in adjustable Y's, like those of a transit-instrument; but in the instrument before us, the adjustment was made permanent by the maker.

Lastly, the adjustment of the vernier to zero of the semi-circle is made by the screw near M, which elevates or depresses the whole frame in which the telescope and semi-circle move more or less consequently, and the angle 15. of motion; but it is not essential that zero of the semi-circle should be at zero of the semi-circle when the level is known, because when an altitude or depression is repeated in the reversed positions of the telescope, the two readings will have equal and opposite errors; and one half of the difference of those readings will be the constant index error, which may be ascertained with great precision from an average of a number of reversed observations.

The lower telescope, being placed as a guard to watch any azimuthal alteration in the position of the instrument, requires no adjustments, except that for distinct vision, after it is brought to its object by its proper vertical and horizontal motions, in which situation its horizontal motion is clamped by the screw I under the horizontal plate.

After the adjustments are all made, or examined, the theodolite may be used for measuring either horizontal or vertical angles in the following manner. Let us suppose two lines erected vertically on level ground, one towards the north and the other towards the south of the station where the instrument stands in a flat of adjustment; and let it be required to ascertain the angle subtended at the centre of the instrument by a line joining these lines: in the first place, the lower vernier No. 1. must be clamped to 360° on the horizontal circle, and the clamping screw F must be released, so that the upper telescope, vernier-plate, and graduated horizontal circle, may all move in azimuth together, till the staff to the east is seen in the field of view; the lower vernier No. 1. may then also be made fast, and the screw of flow motion, G, will bring the staff to bisect the angle formed by the spider's lines, in which situation zero of the measuring circle is truly placed; in the next place, bring the lower telescope, by its proper screw H, into precisely the same situation, and fix it there by the fixing screw I. Then having examined that the upper telescope has not moved from the staff by any accident, release the clamping screw that held the vernier-plate, and turn the upper telescope, till the second staff in the south bisects the angle of the spider's hairs; which may first be done roughly before clamping, and afterwards more exactly, by the tangent-screw of the clamp; then, having examined the position of the lower telescope again, let all the four (or three) readings of the vernier-plate be put down, and take the fourth (or third) part of their amount as the true angle, and fee that both teleopes have their rays bisecting their respective angular spaces as at first, after the measuring are read, and then the average thus ascertained will be nearly the true angle: but to prove the exactness of the measure thus taken, and also the accurate construction of the instrument, the telescope being in the Y's may now have its position reversed, and then No. 3; of the four verniers must be clamped to the point 360° of the graduated circle, and the same operation must be repeated, when another average of four measures will be had, and an average of these two results with opposite index errors, may be considered as very near the truth; and more particularly if there are only three verniers; for then, as we have stated above, the readings will be at fixed equidistant points of the circle, and will correct for excentricity as well as inequality of divisions, if any exist. In ordinary measurements of angles, in small surveys of land, this attention to extreme accuracy may be superfluous, where the instrument is well centered and graduated; but where the lines to be measured are long, the angles cannot be taken with too much care; particularly when any side of a triangle is to be determined, or checked, by the opposite angle.

In taking an angle of altitude or depression with the semi-circle of the theodolite in question, very great accuracy is not to be expected, seeing there is but one vernier; but by proper attention to the previous adjustment of the level of the upper telescope, and by using the telescope in the reversed positions, two measures will be obtained with opposite errors, that counteract each other's effects, so as to render the measure true to 15°. It is hardly necessary to add, that the measure of a vertical angle is taken by the horizontal spider's line, and that the lower telescope is of no use in taking such measure.

We proceed, lastly, to exemplify the use of a common theodolite by an actual survey of a small estate, such as will come within the limits of one of our plates, and by an explanation of the manner in which a field-book is kept in practice, and its contents transferred to the formation of a map, agreeably to the most approved methods of measuring and plotting an estate of any assigned dimensions. For this part of our article we are indebted to Mr. James Wadmore, whose experience and acknowledged skill, in his profession of land-surveyor, eminently qualify him for communicating the requisite information which we have referred for this place, to render the subject of surveying complete.

Preparatory to making a survey with the assistance of a theodolite, I consider it indispensably necessary, (says Mr. Wadmore,) that the surveyor should feel well assured that his instrument is in a perfect state of adjustment, and also that his chain is correct, otherwise no dependance can be placed upon the most particular and minute field-book he could make; for if these primary things are not attended to, the result of his labours, on plotting his dimensions, will turn out to be only so much unhappiness, as he may have bestowed upon his survey.

In order to obviate these difficulties in some measure, I most earnestly recommend to the young practitioner, that, in choosing his theodolite, as well as his protractor, cafe of instruments, plotting scales, &c. on which every thing depends to enable him to complete his surveys with correctness, that he be not sparing of a little money in purchasing those that are good, and can be relied upon for accuracy; and as being furnished with such, in the first instance, will be the means of ensuring to him that ultimate dispatch in the progress of his profession, which will lead him to the most satisfactory results.

As nearly the whole of the profession of surveyors have some material or nice distinctions in keeping their field-books,
books, arising either from the peculiar methods they have been taught, the instruments they use, the methods the more experienced have been led to adopt; from the more enlarged and enlightened views they may have taken to ascertain the best possible manner of facilitating the desired object, of making a correct survey; or from the more improved state of mathematical science; I trust I may be permitted to offer the following method of taking dimensions, the form of keeping a field-book, and the method to be adopted in plotting the same. Having made use of the theodolite, and endeavoured, by practical experience, to avail myself of its most beneficial services. I have no doubt but the specimens I now submit will be most readily comprehended, and the most intricate and difficult surveys accomplished by the same means; viz. with the assistance of the theodolite, where other methods, by possibility, may be found partially (if not wholly) to fail.

On commencing a survey, I have always found it necessary to look out for an intelligent labourer, well acquainted with the locality of the neighbourhood, with whole affiance, and another to carry the theodolite; I usually commence; invariably taking the chain myself after the leader: and here it may not be amiss to remind the young practitioner, that, in following, he must be most particular in directing his chain-leader in a straight line, otherwise the relative bearings of the stations forward, taken by the theodolite, will be rendered incorrect, and the protractor in plotting will not fail to convince him of his error, to his great chagrin and disappointment. I must also remind him of the necessity of keeping his chain-hand, and also directing that of his chain-leader to be kept as near the surface as conveniently can be done, and the chain properly stretched, by which means he will obtain more correct lengths in measuring from station to station, inferring thereby the greater accuracy in his survey (particularly if it be large); as he will very early find, in the course of his practice, that errors, when once begun, will rapidly increase; to prevent which, it will be found very convenient to plot every day's work on his return home, before he commences another, when, if any error is found, it can be rectified on the following day.

Many other necessary precautions might be given to the young surveyor, which by some may be thought superfluous, but the following I cannot help recommending to his attention; viz. that of being exceedingly particular in marking and describing his exterior boundaries, having myself, more than once, found litigation prevented by the production of correct surveys, where the boundaries of estates in dispute were clearly defined. And let him not be fearful of taking too many offsets, or dimensions: for by truthfully observing necessary to his survey to memory, he cannot but fail to omit some; whereas by a copious field-book, not even the slightest bend in a fence, or object of any sort, can possibly be omitted. Above all, let him feel well satisfied of the correctness of his chain; to enable him to do which, he should always have a spare one, on a large survey, to correct by; as it is well known that accidents will happen by the breaking of the same, by lots of rings, &c.; and the offset staff, from being too short, cannot be depended upon for this purpose.

Having said thus much, I now proceed to shew the method I have practiced in surveying with the theodolite; in doing which, I shall first premise that I have always considered it advantageous to take a view of the estate to be surveyed, by doing which, I have been enabled to avail myself of studying the best stations, and to judge how the business may be accomplished with the greatest facility.

The theodolite which I have been accustomed to use is a very good one, made by Cary, about five inches diameter on the limb, which is finely graduated, with a vernier reading minutes, and with degrees numbered from 1 to 360; it has an achromatic telescope and vertical arc, for the purpose of ascertaining the angles of elevation and depression in hilly surveys, on one side, and the corresponding deductions to be made in the chain lines on the other, and moves by rack-work.

"The method adopted by me, after some years' practice, in keeping a field-book, perhaps may be thought singular, namely, that of commencing at the bottom of the half page of the same, and working upwards therefrom; but it will readily be seen, on reference to the accompanying field-book in Plate X. to be the best way, as in proceeding, you meet the objects you have to describe in succession as you advance, and it affords a much greater facility in laying off the offsets from the chain-lines, than in the other way.

"It is well known that the needle is frequently affected, in the first place, by the atmosphere, and liable to get out of order; in the second, the chain being made of iron as well as the arrows, and their not being moved a sufficient distance in general, when the theodolite is planted for taking an angle, it may thereby be very materially affected; in the third, articles of iron or steel may be about the persons attending the survey, which may have the same effect; in the fourth, it may not be found improbable, from the very nature of the ground on which a survey may be carried on, that veins of iron, or metallic ore, may exit under the surface, which will not fail to influence the polarity, to the utter detriment of ascertaining the true bearings; and, lastly, without a vernier, the angle cannot be read with sufficient accuracy.

"Trusting that the foregoing remarks will suffice to convince those, who may be as much as to surveys by the needle alone, of the danger of truing to this method, as well as to prevent the student in the profession from doing, I now proceed to shew, that by taking the included angles of the survey upon the limb of the theodolite, and by carefully noting them in the field sketch, (as seen in the plate,) no such danger can possibly exist. The following problem will give sufficient proof of the accuracy of this method of measuring the internal angles of any geometrical figure, whatever may be the number of its sides; viz. double the number of sides, and multiply them by 90°; and then, if 360° be subtracted from the product, the remainder will be the sum of all the internal angles; for if we suppose lines drawn from every angle to one common point in or near the middle of the figure, there will be as many triangles as there are sides, and the sum of all the angles at the apex, or point assumed, will be 360°, as will appear when circumscribed by a small circle: therefore, as every triangle contains 180°, the amount of all the triangles will be as many times 180° (or 90° x 2) as there are bases, when diminished by 360°. In our example, the survey is bounded by five chain lines, with as many included angles, and therefore the amount of the angles will be 5 x 90° x 2 = 360°; or 90° - 360° = 540°, agreeably to the subjoined measurements taken in the field; viz.

\[
\begin{array}{c|c|c|c}
\text{At} & \text{2} & \text{4} & \text{6} \\
\hline
\text{O} & 35° & 14° & 60° \\
\text{O} & 38° & 18° & +74° \\
\text{O} & 73° & 36° & +71° \\
\text{O} & 87° & 12° & \\
\end{array}
\]

Total sum \[540°\]

Having
THEODOLITE.

Having said so much relative to the means of applying the theodolite most beneficially, I shall now explain an example of each of the methods I have alluded to; in doing which, I beg it may be understood, that although the difficulties I have enumerated may in some cases exist, yet it is possible a survey of moderate extent may be carried on by the needle with caution sufficient to obviate them; though I am fully satisfied, from experience, that the latter method is the most to be relied upon: I shall, however, proceed to exemplify both in the order before-mentioned.

"The Method of using the Theodolite in ascertaining the Bearings by the Needle.—It will be seen by the field-book, that I commence at (station) 1, at the back of the mansion; here, having the theodolite firmly fixed in the ground, by means of the four adjusting-screws, I set it perfectly level, first in the direction of the magnetic north, and afterwards at right angles; being thus satisfied, I set the vernier on the upper limb correctly to 180° on the graduated circle, and loosen the screw that fixes the instrument. I then move the graduated circle round until I ascertain that the needle points to N. in the compass-box, and then tighten the same screw, which prevents it from moving. Being now ready to take the bearing from 1 to 2, I direct the telescope to some object in that direction, keeping as near to the boundary-fence as can well be admitted, in order to reduce the length of the offsets; and having brought the cross-wires in the telescope to bear upon the object, I then look to see what part of the limb is cut by the vernier, which I find to be 180° 1', and in a north-west direction. This I note down as in the field-book, and afterwards examine whether it is correct. I then direct the chain-man to move forward towards that object, leaving a mark behind, to return to, and proceed by first taking the following offset at 0°; that is, at the place of commencement, I find an offset to the right of 86 links to lady Buckinghamshire’s fence, and 40 from thence back to the building, which I note down. I then proceed, and at 212, I measure 5 links to the right, to a tree; and going forwards at 274, I measure 2 links to the left, to another tree, (which objects I always induce to mark in the survey, for the purpose of embellishing the final map); proceeding onwards at 310, the offset to the corner of lady Buckinghamshire’s hummer-house is 10; at 360, the chain touches the fence, consequently I mark the offset 0 (nothing); at 738, there is an offset to the left of 23 links, to a tree; and at 917, one to the fence of 13: continuing the line, I set up a mark at 950, and write the name down in the field-book, thus "950 (3) mark left," meaning it for a station, to join to hereafter: I call it station (3), being the next number following the station I am measuring towards; and I denote it in a circle, to make it more prominent to refer to; and mark the 950, the number of links on the chain-line, also in a circle, that I may not err in plotting off the situation of the same. I then go on, and at 960 come to the outer edge of a small clump of trees; at 975, an offset to the left affords the width of the clump that way to be 50 links, and one to the right of 13 links to the fence; 986 passes the outer edge of the clump; at 1031, an offset of 31 links on the left to the canal; at 1100, passing close to the edge of the canal, there being no offset on the left, I mark it 0 (nothing); at 1155, I cross the gravel-walk, the width of which was previously noted in the field-book to be 8 links; and at 1180, I halt, and mark the offset to the fence on the right 5 links. Here I again plant my theodolite, as before, exactly over the station-hole; and after setting it perfectly level, and having brought the vernier 360° on the circle, and ascertained that the needle was correctly pointing to N. in the compass-box, I tighten the fixing-screw, then move the telescope round gently to the left, until the cross-wires cut a conspicuous object in the direction in which I mean to proceed, and ascertaining that the vernier cuts 335° 7′ in a south-well direction in the box. This I note down immediately in the field-book, as there represented; and after examining that I had done so correctly, I proceed on to measure the line from 2 to 4, taking the offsets right and left, and making the necessary remarks, to enable me to give a correct map and description of the estate, and so on throughout the survey. I have been particular in the field-book, which I trust, by the above description, will be considered to be a plain and facile way.

"The Method of using the Theodolite in ascertaining the Angles upon the graduated Circle, without Reference to the Needle.—On commencing, I plant the theodolite firmly in the ground, and after adjusting the level perfectly, and setting the vernier to 360° on the limb, I move the circle round, until I ascertain that the needle in the compass-box points correctly to N.; then tightening the screw that fixes the instrument, as before, I move the telescope gently round in the direction of the line to 2, in doing which, I find that the vernier cuts upon 360° 2′ N.W. This is noted down, in order to have the bearing of the estate upon the map, and which, on being deducted from 360°, leaves an angle to the left of the meridian of 29° 58′, as shewn in the example: then leaving a mark at station (1), and having proceeded along the line to station (2), and taken the offsets, and made the necessary remarks in the field-book, as in the former method, on arriving at (2), I again plant the theodolite firmly in the ground, and adjusting it as before, move the telescope round until the cross-wires cut the lower part of the mark left at (2); then noting in my field sketch the number of degrees cut by the vernier upon the limb, without regarding zero, I afterwards move the telescope carefully round to the right, and direct it towards 4; and bringing the cross-wires in the telescope to cut the object proposed to be measured, I look and see the number of degrees cut by the vernier on the limb, as before: deducting one from the other, I get the 2 at (2), viz. 35° 14′; and after having measured the line, on my arriving at (4), I proceed exactly in a similar way, by first looking back to the last station, and then forward to the next, deducting the number of degrees and minutes in one direction from those read in the other, which gives the angle 88° 18′. Following this course, I proceed on the survey until all the angles and sides are completed.

"It is necessary, however, before quitting each station, to take particular care in reading off the angles by the vernier, and also in writing them down correctly; and in this way of proceeding, the trouble of adjusting for zero of the vernier to 360° at every station is avoided.

"By plotting, is understood the making of a draught of the estate from the field-book; and as the instruments necessary to be used by the surveyor, in taking the dimensions in the field, are such, that he may be enabled to ascertain distances and angles correctly; it naturally occurs that corresponding requisites are necessary to make a groundplot, or draught thereof, for laying down the quantities of the several angles, and of the distances measured by the chain upon paper, which are usually accomplished by means of the protractor for the former, and sakes of equal parts for the latter.

"With respect to the protractor, I have hitherto used, and recommended the young surveyor to use, one of eight inches
which, on deducting the quantity of one from that of the other, I find to be 85° 14': this I prick off, and drawing a line thereto, I mark off the length of the chain-line 1274 links, and so continue to proceed until the boundary is finished. I then proceed to mark off the offsets at their proper points in each chain-line, and connecting the points of such offsets, I have the boundary defined of its true shape and dimensions, as seen in the map. Lastly, I call up the dimensions of the several triangles and offsets, considered as small trapeziums, the method of doing which has been explained under the word CHAIN, and find the contents as expressed in the subjoined table.

**Freehold in Hand.**

<table>
<thead>
<tr>
<th></th>
<th>A. R. P.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Mansion, out-buildings, shrubbery, lawn, canal, &amp;c.</td>
<td>8 1 16</td>
</tr>
<tr>
<td>B. Garden</td>
<td></td>
</tr>
<tr>
<td>C. Part of Pightle (formerly Woolley's)</td>
<td>0 3 10</td>
</tr>
<tr>
<td>D. Adjoining shrubbery and lawn</td>
<td>0 2 13</td>
</tr>
<tr>
<td>E. Freehold part of garden</td>
<td>0 0 37</td>
</tr>
<tr>
<td>F. Stable</td>
<td>0 1 14</td>
</tr>
<tr>
<td>G. Cottage and garden</td>
<td>0 0 2</td>
</tr>
<tr>
<td></td>
<td>0 1 0</td>
</tr>
<tr>
<td></td>
<td>10 2 11</td>
</tr>
<tr>
<td>Total freehold</td>
<td>10 2 11</td>
</tr>
</tbody>
</table>

**Copyhold in Hand.**

<table>
<thead>
<tr>
<th></th>
<th>A. R. P.</th>
</tr>
</thead>
<tbody>
<tr>
<td>H. Sheds and yard</td>
<td>0 0 21</td>
</tr>
<tr>
<td>I. Copyhold part of garden</td>
<td>0 0 5</td>
</tr>
<tr>
<td>K. Woolley's three acres</td>
<td>0 1 21</td>
</tr>
<tr>
<td>L. Late Slatt's</td>
<td>0 1 27</td>
</tr>
<tr>
<td></td>
<td>3 5 34</td>
</tr>
<tr>
<td>Total of eflate</td>
<td>14 2 5</td>
</tr>
</tbody>
</table>

**THEODORE I.** pope, in *Biography*, was the son of a bishop of the same name, and born at Jerusalem. He succeeded John IV. in the papal chair in the year 642. Of this pope no material circumstance occurs, except his controversy with the church at Constantinople, concerning the doctrine of the Monothelites; and this controversy is so little interesting to our readers, that we shall pass it over without any further notice. Theodore died in the year 649.

Besides some letters relating to the above-mentioned controversy, a memorial against Pyrrhus, the deposed patriarch of Constantinople, and his errors, addressed to the Eastern bishops, is preferred. **Bower.**

**THEODORE II.** pope, a native of Rome, succeeded Romanus about the close of the year 898. During his possession of the see, which he held only for twenty days, he castrated the body of his predecessor Stephen to be taken out of the Tyber, and interred in the Vatican, and declared all his acts to be legal and valid. **Bower.**

**THEODORE LASCARI.** a Greek emperor, was son-in-law of Alexius Angelus, who imprisoned his brother Isaac and usurped the throne. Having valiantly but unsuccessfully defended Constantinople against the French and Venetians in the year 1204, he withdrew from the scene of conflict across the Bosphorus, and put himself at the head of a body of troops; but when he found that the confederates were pursuading him, he sought refuge with the Turkish sultan of Iconium. Being joined by the inhabitants of Bithynia, he took possession of the country from the river Meander to the Euxine sea, and fixed his residence at Nice, where he was crowned by the patriarch of Constantinople. When his father-in-law heard of his success, he went over from Greece,
THEODORUS, a learned prelate of the Greek church, was born at Antioch about the year 386, and placed at the age of seven in the monastery of St. Euprepius. He was educated under Theodore of Mopsuestia and John Chrysostom, and from his youth addicted himself to all the authorities and exercises of a monastic life. Upon the death of his parents, he distributed his whole property among the poor. In the year 420, or 423, he was consecrated, against his own inclination, bishop of Cyprus in Syria, in the Eastern province, the inhabitants of which were ignorant and barbarous, and notorious for their superstitious practices and heretical errors. Theodoret laboured industriously and successfully in enlightening and reforming them. In his own conduct he was an exemplary pastor; and in every thing

Greece, where he had remained concealed, to Asia, and explored the affinities of the sultans of Iconium in recovering that part of his dominions of which Theodore had taken possession; and having induced him to march with 20,000 men, he laid siege to Antioch on the Meander. Theodore, at the head of 2000 men, marched to its relief, and routed the besiegers. The sultan renewed the contest, and trusting out Theodore, beat him off his horse; but the emperor recovering himself, unhorsed the sultan, cut off his head, and placing it on a pole, terrified his enemies, so that they all fled. Alexius was carried, as a prisoner, to Nice, where he was confined. Theodore, having made peace with the Turks, formed a treaty with the Latin emperor of Constantinople, and spent the remaining eighteen years of his reign, in securing his newly-founded empire, which he transmitted to his descendants; bequeathing it, at his death, to his son-in-law, John Ducas Valesiates. The Nicene empire terminated about fifty-seven years after its establishment by the elevation of its predecessor, Michael Palaeologus, to the throne of Constantinople. Anon. Dict. Gibbon. Gen. Biog.

THEODORE, bishop of Mopsuestia in Cilicia, was priest, and probably native, of Antioch, a disciple of Diodorus, and an intimate friend of John Chrysostom. He was ordained bishop in 392 or 394, and died in 428 or 429. Sozomen says, that he was well skilled in the sacred ceremonies, and in the liberal sciences of the rhetoricians and philosophers: and Theodoret calls him the doctor of the whole church, saying that he was bishop thirty-six years, and that he wrote against all heresies, particularly those of Arius, Eunomius, and Apollinaris. He wrote commentaries probably upon all the books of the Old and New Testament, though two or three of them are not particularly mentioned: and in these commentaries, as Photius says, he avoided all allegorical interpretations, and confined himself to the historical and literal sense. He defended this mode in a work concerning an allegory and history against Origen. Some have charged him with treating the book of Job, the Canticles, and the Psalms, with disrespect; but these are the accusations of his enemies, and perhaps founded in error, as he actually wrote comments on some of these books. The book of Job he is said to have represented as written in a fabulous manner, though founded on truth; the Canticles he is said to have considered as a nuptial poem, and the Psalms as chiefly referring to the history of the times. His other works were numerous, and related to the controversies of his times, and to various theological doctrines. Most of Theodore's works are now lost, but some fragments of them may be found, chiefly in Latin, and perhaps not fairly represented, in the Acts of the second general council of Constantinople, or the fifth general council, held in 553, and also in Facundus, and in the Greek Chains. Fabricius affirms us, that his commentary upon the Twelve Prophets is still extant in manuscript in the emperor's library at Vienna; and Montfaucon speaks of its being in the library of St. Mark at Venice, as well as in the library at Vienna, and in the Vatican.

Theodore was no less celebrated as a preacher, than as a commentator and general writer; under the former character he was admired at Antioch, at Constantinople, and all over the East. Distinguished by his learning and liberality, considering the time in which he lived, he has been charged with adopting the sentiments of Nestorianism and Pelagianism; and some moderns have called him the parent both of Pelagianism and Nestorianism; whilst others allow, that he held the Pelagian principle, but are of opinion that the charge of Nestorianism is not so clear. The above-mentioned council devoted a conference to the examination of Theodore's writings; and began with reading a creed attributed to him upon which the bishops clamoured for an anathema against his books and his person, and against all who did not join in that anathema. Several bishops, however, rofe in his defence, and refused to concur in the anathema. Some moderns have charged him with adopting sentiments concerning the person of Christ similar to those of the present Unitarians; but of this fact there is no satisfactory evidence. Motheim. Lardner.

THEODORE of Tarsus, a monk of that city, was ordained bishop by pope Vitalian, and being sent into England in the year 668, at the desire of king Egbert, was appointed to govern the church of Canterbury. In this high station he faithfully employed himself in digging the faith and ecclesiastical discipline of England; and after having spent twenty years in the performance of various important and useful services, he died in 690, at the age of eighty-eight years. With a view to the restoration of the neglected discipline of penance, he published a book of canons, under the title of "Penitential." In this book, sins were distributed into various classes, according to their respective nature and aggravation; and various kinds of penance were assigned to them; forms of confession, exhortation, and abjuration were preferred, and other such matters respecting discipline were regulated. This Penitential passed from Britain to other countries, and became the model of similar works. It is still extant, in an imperfect state; and an edition of it was published at Paris by Petit, in 1679, 4to, with notes and dissertations. Dupin. Motheim.

THEODORE STUDITA, an eminent ecclesiastic of the ninth century, was educated under Plato, head of the monastery upon mount Olympus, the government of which was committed to him in the year 795. By avowing his opposition to the marriage of Constantine Copronymus to one of the maids of honour of his wife, whom he had compelled for this purpose to take the religious vows, and by his separation from the communion of the patriarch of Constantinople, Theodore incurred banishment; but at the death of the emperor he returned, and was appointed abbot of the monastery of Studa, in the suburbs of Constantinople. On account of his disapprobation of the decision of a synod which declared the second marriage of Constantine lawful, he was banished a second time. After the death of the emperor Nicephorus, in 811, he returned from banishment, and was reconciled to the patriarch. For his zealous defence of image-worship in the reign of Leo, he was banished a third time, and treated by the emperor with great severity. In 821 the emperor Michael allowed him to return to Constantinople, where he indulged a freedom of speech which obliged him to withdraw. He died in the year 826, in his sixteenth year. He was a man of learning, and author of many works, which were published by Sirmond, in Greek and Latin, at the end of his own works. Dupin. Motheim.

thing that related to his own gratification, he was self-denying and frugal, that he might possess more ample means of relieving the poor and promoting works of public utility. No bishop of his time was more active in performing the duties that pertained to his profession and station, or had greater influence in every kind of public business, particularly of ecclesiastical nature.

He was prudent in counsel, and always disposed to compromise in his temper, and to command mutual forbearance and even among contending parties. Butlike other pacificators, he could not escape obloquy and harsh treatment. Between him and Cyril, however, an irreconcilable antipathy existed, as was generally the case between the Eastern and Egyptian bishops; and this antipathy was manifested, even after Cyril's death, by his successor Dionysius, who caused Theodoret to be anathematized, and to be deposed in a general synod at Ephesus. In the reign of the emperor Marcian, a general council was assembled at Chalcedon; and this council decreed, that Theodoret was worthy to hold his see, and he was accordingly restored to the church of Cyprus. He died, without any further molestation, in the beginning of the reign of the emperor Leo, A.D. 457 or 458.

Theodoret bears a high rank among the ancients as a commentator on the scriptures for the purity of his Attic style, and the clearness and good sense of his explanations. He wrote commentaries on most parts of the sacred Scriptures. His canon of the Old Testament was very little, if at all, different from that of the Jews. With regard to the New Testament, it appears that he received only four gospels, the book of Acts, which he ascribed to St. Luke, and fourteen epistles of the apostle Paul, upon which he wrote commentaries: digesting them according to the order of time in which they were written, and noticing the places from which they were sent. He has seldom quoted the Catholic epistles, though they are not wholly overlooked. He seems to have received the epistle of James, the first of Peter, and the first of John; but there is no certain proof that he received the book of the Revelation, or the other four Catholic epistles; so that we may conclude, that his canon of the New Testament was the same with that of the Syrian Christians. His "Ecclesiastical History," comprised in five books, may be considered as a supplement to those of Sozomen and Socrates; beginning where that of Eusebius ends, at the rite of Arianism in 322 or 323, and terminating in 428. Its style, according to Photius, is clear and sublime, but too much abounding in metaphors. It is deficient in chronological precision, but contains many valuable documents, and some remarkable circumstances, which other ecclesiastical historians have omitted. His "Philology," or treatise on the monastic life, the genuineness of which some have questioned without sufficient reason, relates the actions and extols the piety of the Eastern monks, and abounds with instances of the credulity and superstition of the times. In his work entitled "Of Heretical Fables," in five books, he distinguishes the different heresies into classes, and concludes with a statement of the faith of the Catholic church. "The Cure of the false Opinions of the Heathens," in twelve discourses, is a learned and valuable apology for Christianity. Lardner has given copious extracts from this performance, which, with high commendation. His other works consist of letters and tracts on different theological subjects. They are all comprised in the best edition of his writings, which is that of Father Sirmond, in four vols. fol. Gr. and Lat. printed at Paris in 1642. To these the defunct Garnier added a fifth in 1684. Beaufobre gives the following candid account of Theodoret. "Theodoret is, in my opinion, one of the most valuable of the Fathers. He is learned; he reasons well, especially in his dialogues against the Greek heretics of his time: he is a good literal interpreter of the Scriptures. I cannot but admire his prudence and moderation, when I consider that he ended his ecclesiastical history at the time when the Neflorian disputes, in which he was so deeply interested, began. But, I fear, his zeal against heretics imposed upon him all too much, as his admiration of the heroes of the world, with whom he was charmed. Monasteries have undoubtedly sent forth great men into the world; but the discipies of the monks contracted in their youth a supranatural disposition which is rarely ever shaken off; and the weak side of this able man seems to have been an excessive credulity." Dupin. Mofheim. Lardner. Beaufobre.

THEODORIC I., king of the Vigufoths, was the son of Alaric, and in 419 succeeded Wallia in the kingdom established in the south of France. After raising the siege of Arles, he made peace with the Romans, and was subsidized by them in the Spanish war; but being desirous of renewing his attempts in Gaul, he took an opportunity, in 435, of renewing his hostilities against them, and laid siege to Narbonne; but being compelled to raise the siege, he was under a necessity of directing his attention to the safety of Toulouse, his own capital, which was invested by a body of Huns, under the command of count Litorius. In a very fanguinary engagement with the assailants, he totally routed them, and took Litorius prisoner; who was first exposed to the insults of the populace at Toulouse, and then thrown into a dungeon, where he died. After this event, Theodoric made peace with the Romans. His rank among the sovereigns of that period was respectable; and both his sons and daughters were well educated. The latter formed matrimonial connections with the eldest sons of the kings of the Suevi and Vandals, who reigned in Spain and in Africa. But these connections proved unfortunate. The husband of the Suevian princess was assassinated by his brother; and the Vandal princes, being suspected of a design to poison her father-in-law, Gunderic, was doomed to lose his nose and ears, and in this mutilated condition was sent home to his father. Theodoric eagerly sought an opportunity for revenging this cruel insult. With this view, the Vigufoths and Romans formed an alliance to resist Attila the Hun, who, instigated by Genserich, invaded Gaul in 444; and Theodoric, at the head of his army, marched to the relief of Orleans, which was besieged by the Huns. In their way the hostile armies met on the plains of Chalons, and a dreadful battle ensued. Theodoric was wounded by a Goth in the service of Attila, and being disembowled, was trampled to death under the feet of his own cavalry. When his body was found, his funeral rites were performed in the face of the retiring enemy.

THEODORIC II., king of the Ostrogoths, surnamed the Great, was a descendant of the Gothic race of the Amali, and born near Vienna, A.D. 455. At the age of eight years, he was sent to Constantinople as a hostage for the fulfilment of the subsidiary treaty formed by the emperor Leo with the Goths. Here he had an opportunity of acquiring that character which he maintained among the princes of that age; but his means of instruction must have been very limited, when it is considered that, though he excelled in all military exercises, he was so badly taught, as not to be able to write his own name. After ten years' residence at the court of Leo, he returned to his father, Theodoric, who was then the sole ruler of the Ostrogoths, in whose service he distinguished himself by his martial spirit. Upon the death of his father, in 475, the crown devolved on Theodoric. The emperor
peror Zeno, wishing to secure the attachment of the young prince, invited him to his court, and conferred upon him the rank of patrician. After having rendered full and faithful service to the emperor, he was reduced to the necessity of defecting the Roman cause, and forming an alliance with Theodoric, the son of Triarius. Having been altogether neglected by Zeno, he marched in an hostile manner into the fertile provinces of Thrace, which he laid waste with wanton cruelty. In the war that ensued between the empire and the Goths, a variety of events occurred; but, upon the whole, Theodoric became more and more formidable, and by the death of the son of Triarius, he was placed at the head of his nation. Such was the power he acquired, that the emperor found it necessary to cede to him part of Lower Moesia and Lower Dacia, and to honour him with the consulship, which office he discharged at Constantinople. But conceiving that he was an object of jealousy, and that his life was in danger, he withdrew into Thrace, and afterwards avowed himself an undisguised enemy to the empire. Declining to lay siege to Constantinople, he determined, as it is said, at the suggestion of Zeno, to turn his forces against Odoacer, who having deposed Augustulus, the last Western emperor, had assumed the title of king of Italy.

In the year 488, Theodoric, having collected together all the swarms of Goths that had successively arrived on the frontiers of the empire, set out on his Italian expedition; and after encountering many difficulties in his progress, descended from the Italian Alps, and reached the banks of the Sontius near Aquileia. Here, in August 489, he attacked Odoacer's numerous host, and forced him to retreat as far as the plains of Verona. The result of a second engagement was a complete victory on the part of the Goths, which compelled Odoacer and his fugitives to take refuge within the walls of Ravenna, while the conqueror obtained possession of the cities of Pavia and Milan. But, as the fortune of war is uncertain, one of Odoacer's commanders, having defected to Theodoric, proved treacherous, and induced several of the officers of the Gothic king to join his former master. Odoacer, having also gained possession of other fugitives from the Gothic service, recovered Milan, and obliged Theodoric to immure himself in Pavia. Theodoric, however, in this crisis of danger, obtained a powerful reinforcement from Alaric II., king of the Visigoths, settled in Gaul, and attacking Odoacer on the Adona, totally defeated him. Upon this disfalter, Odoacer fled to Ravenna; where, in the autumn of 492, he was besieged by Theodoric, who had made himself master of all Italy, except this city. In the following spring, Odoacer was reduced to the necessity of proposing terms of accommodation, with which Theodoric complied; and the consequence was the surrender of Ravenna to the Gothic army. It was stipulated between these two sovereigns, that they should govern Italy with equal authority. Such a stipulation was not likely to produce any permanent effect; and it was very soon violated on the part of Theodoric, by an act which entails on his memory eternal dishonour. Having invited Odoacer to a banquet, he stabbed him, as it is said, with his own hand, under a pretext that his dead rival had formed a similar design with regard to himself. After this event, Theodoric assumed the enigms of royalty, and caused himself to be proclaimed by his army "king of Italy." This assumption was reluctantly confirmed by Anastasius, the successor of Zeno. The manner in which he exercised the royal authority, however unwarrantable the means by which he acquired it, placed him far above all the sovereigns of that age. Steady having been united to Italy by a voluntary cession, Theodoric sheathed the sword of war, and cultivated alliances with neighbour-
count of the circumstances to which we here refer, see the article Boethius. Theodoric, at the close of life, reflected without doubt with remorse and self-reproach on his conduct towards Boethius and Symmachus. It is said that, whilst he was sitting at table, he perceived the gaping head of a large fish, which was served up before him, and at the sight exclaimed, that he beheld the angry and menacing countenance of Symmachus. Then probably did that fever commence, which being attended with a dysentery, terminated his life within three days, August, A.D. 526, in the 73rd year of his age, and the 14th of his reign, dating its commencement with the death of Odooerus. His dominions were divided by his testament between his two grandsons, Amalric and Atha-

Athenian monies.

THEODORIC, of Thieny of Nien, an ecclesiastical writer, was born at Paderborn, and served Gregory XI. Urban VII. and several succeeding popes, as under-secretary. The time in which he lived may be inferred from his "History of the Schism of the Popes," written between the years 1400 and 1410; in which he says that he had lived near thirty years at the court of Rome, and that being then worn down with age, it was his intention to withdraw from public business. This work, compiled in Latin, comprised, in three books, the interval from the death of Gregory XI. to the election of Alexander V. Another work relating to the same subject was entitled "Nemus Unions." In 1412 he published a "Treatise on the Rights and Privileges of the Emperors in the Inveifiture of Bishops and Abbots." He also wrote a journal of the proceedings of the council of Conftance, ending in June 1416, in which year he died. From his own observation, he exhibits a shocking picture of the court of Rome, and the clergy of that period. Dupin. Moreiri.

THEODORIDPOLIS, in Ancient Geography, a town of Myconda, founded by the emperor Justinian, who called it after the name of his wife.

THEODORUS, in Biography, a Cyrenean philosopher, was a disciple of Ancierris, and for speaking freely concerning the gods, he was stigmatized with the appellation of Atheist, and banished from Cyrene. At Athens, where he sought refuge, he was protected by Demetrius Phalerus, and gained access to the court of Ptolemy Lagis. Afterwards, upon his return to Athens, he is said to have suffered death by hemlock; but it has been disputed whether atheist, or contempt of the Grecian superstitions, was the cause of his death. He is joined by Sextus Empiricus with Eume-

us, and others, who maintained, that those who were esteemed gods, were men who had possessed great power on earth; and Clemens Alexandrinus expresses his surprize, that Eumenus, Nicander, Diogoras, Theodorus, and others, who had lived virtuously, should be pronounced atheists from their opposition to gentle polytheism. Brucker by Enfield, vol. i.

Theodorus, an Athenian flute-maker, the father of Hocrates the orator. How great the demand was at this time for flutes at Athens, may be conceived from a circumstance mentioned by Plutarch in his life of the orator. His father, says he, acquired wealth sufficient by his busi-

ness, not only to educate his children in a liberal manner, but also to bear one of the heaviest public burdens to which an Athenian citizen was liable; that of furnishing a choir or chorus for his tribe, or ward, at festivals and religious cere-

monies. See Isemnias.
and as their own country was occupied by the Huns, he permitted them to settle in Thrace and Media, with exemptions from tribute and taxes. With Maximus, who had revolted against the emperor Gratian, Theodosius entered into a treaty, by which it was stipulated that the usurper should retain the countries beyond the Alps, and that Valentinian, the brother of Gratian, should be secured in the possession of the remaining part of the Western empire. Maximus was acknowledged by Theodosius as his colleague in the Roman empire, and Arcadius, the son of Theodosius, though only eight years of age, was admitted to a share in the purple.

At this time Theodosius issued some severe edicts against heathen idolatry; and he passed a law against the marriage of cousins-german, which condemned both parties to be burnt alive, and which declared their children illegitimate. In 386, the Gruthungi, or Ostrogoths, in their attempt to pass the Danube, were defeated with great slaughter. In 387, Maximus invaded Italy; and Valentinian, defeated by hissubjects, took refuge in the dominions of Theodosius, who married Galla, the sister of that emperor. In this year the people of Antioch, having without effect remonstrated against the proceedings of Theodosius, both as to religious matters and the imposition of an extraordinary tax, broke out into an insurrection; threatened the life of the governor; and, disappinted in this effort of their rage, demolished the statues of the emperor and his family. Theodosius, in the first transports of remonant, upon receiving intelligence of their conduct, ordered the city to be laid in ashes, and all the inhabitants, without discrimination of age or sex, to be put to the sword. Upon cooler reflection he revoked this fangui-

nary order, and contented himself with deposing Antioch from the rank of a city, and depriving the inhabitants of their customary largesses of bread. Those who upon inquiry were found guilty, were condemned to death. But by the intercession of the bishop of Antioch, and other holy men, the culprits were pardoned, and the city restored to all its privileges.

Theodosius, on a visit to Valentinian at Thessalonica, prevailed on him to renounce Arianism, and to adopt the Nicene faith; and determined to take up arms in his cause against Maximus. After several successful encounters with the usurper, he was deposed of all his imperial ornaments, and dragged like a malefactor into the presence of Theodosius, who caused him to be beheaded. His son Victor was also put to death; and the civil war terminated A.D. 388. In consequence of these events, Theodosius became the sole head of the Roman world; and he invested the son of Valentinian, now a minor, with the sovereignty of the provinces wrested from him by Maximus, and also with the possession of Gaul, Spain, and Britain, of which Gratian had been deprived by this usurper. Theodosius remained three years in Italy, giving vigour to the law, correcting abuses, and adopting a variety of measures for totally eradicating paganism.

In 390, a sedition took place at Thessalonica, which was followed by many disastrous consequences, and by the exercise of a degree of cruelty, which the emperor was obliged to expiate by a public penance. About this time he took advantage of a religious tumult at Alexandria for demolishing the famous temple of Serapis, and of all the heathen temples throughout Egypt. He also issued a final edict against the ancient worship.

In 392, the emperor Valentinian was murdered by his general Arbogastes, and Eugenius was placed on the throne. When this measure was announced to Theodosius, he prepared for war; and having obtained a favourable anefer from a holy hermit in Thesba, whom he consulted, issued new edicts against hereby, and abrogated the ancient penalties of treason against those who uttered seditious words against the prince; he openly took up arms, A.D. 394, and forcing the passage of the Alps, descended into Italy. He met Eugenius and Arbogastes with a great force, and, after several conflicts, Eugenius was totally defeated, and put to death by the foolders. His children, however, and thefe of Arbogastes, who put an end to his own life after the battle, were treated humanly, and removed to their paternal possessions.

After this success, Theodosius lent for his son Honorius to Milan, and declared him emperor of the West; Arcadius having been already put in possession of the Eastern empire. In January 395, Theodosius terminated his life by a dropehe disorder at Milan, at the age of fifty years, and at the close of the sixteenth year of his reign.

The name of Theodosius has been celebrated, but his character has been very differently appreciated. Politically considered, whilst it exhibits many virtues and excellencies, it is chargeable with many errors and obliquities. Connected with the ecclesiastical interests of the period in which he lived, his conduct on various occasions was altogether indefensible; and we may add, that how much fower he has been extolled by partial historians, his bigotry and intolerance were very reprehensible. Anc. Un. Hist. Gibbon's Rom. Hist. Gen. Biol.

Theodosius II., son of the emperor Arcadius, and grand-

son of the preceding Theodosius, was born in the year 401; and being of feeble faculties, was educated merely to sustain the pageantry of a throne; or, as Mr. Gibbon expresses it, "to represent with grace and dignity the external figure of a Roman emperor." His only active pursuit was hunting; and his more private exercises were painting and carving, making elegant transcripts of religious books, and singing psalms. He also failed, gave credit to miracles and doctrines professed to his faith, and paid due homage to all the dead and living saints of the Catholic church. His disposition was gentle and kind; in his conduct he was free from vices, and yet, as his biographer says, "he did not yield to virtues." Upon his father's death, A.D. 408, he succeeded him in the Eastern empire. To the influence of his sister Pulcheria, superior in talents to himself, he implicitly submitted; and in 414, he raised her to the rank of Augusta, and entrusted with all the reins of government. By her selection and recommendation he married, A.D. 421, the celebrated Athanasia, afterwards named Eudoxia. The war which broke out in 422, in consequence of a persecution excited by the Magi against the Christians, terminated in a truce of a hundred years, and a division of the kingdom of Armenia between the contending powers. On the death of the emperor Honorius, in 423, the throne of the West was usurped by John; but Theodosius restored it to its proper heir, Valentinian III., who afterwards married his daughter. When Attila made an irruption into the Roman empire, he was opposed by Theodosius, whose armies were repeatedly defeated; and Theodosius himself was compelled in 446 to make a humiliating treaty with the king of the Huns. By one of his favourites, the eunuch Chryphius, he was induced to free himself from Attila by affiliation, but the treachery was defeated, and he received a jurt and severe reprimand from the barbarian. Soon after this mortification, he died in consequence of a fall from his horse, A.D. 450, in the fiftieth year of his age. What his grandfather had done towards the subversion of the pagan religion in the East, Theodosius completed. He always approved himself a dutiful son of the church, but he is said to have favoured the Eutychian heresy. His principal merit was the publication, A.D. 438, of the
THEODOSIUS, an eminent mathematician, was born at Tripoli, and flourished about the second or third century. On the doctrine of the Sphere he wrote three books, containing a considerable number of propositions, demonstrated in the pure geometrical manner of the ancients, and establishing the geometrical principles of astronomy. Ptolemy and succeeding writers availed themselves of these books, which were translated by the Arabs from the original Greek into their own language. They were afterwards translated from the Arabic into Latin, and printed at Venice; but the defects of the Arabic version were supplied in a more complete edition, published in Greek and Latin at Paris in 1556, 4to, by John Pena, regius professor of astronomy. On this work there have been many comments; but the edition of Theodorus's Spheres now generally used is that of Dr. Barrow, published in 1675, illustrated and demonstrated in a new and concise method.

Theodorus was also the author of two other treatises, one "De Habitationibus," and the other "De Diebus et Noctibus." Greek copies of these were preserved in the king's library at Paris, and a Latin edition was published by Peter Dalypodius in 1572. Montucla Hill. des Mathiens.

THEODULF, a learned prelate of a Gothic family, was a native of Cisalpine Gaul; and being invited to France by Charlemagne, he was promoted to the bishopric of Orleans, A.D. 794, and the abbacy of the monastery of Fleury. He continued in favour at court till the death of Charlemagne, and for some time under the emperor Lewis. But being implicated in the conspiracy of Bernard, king of Italy, against Lewis, he was committed to prison at Angers, where he remained in confinement for three years. After his liberation, and before his return to his diocese, he died at Angers, about the year 821. Theodulf was the friend of Alcuin, and deserves honourable mention as one of theTonyaries and promoters of literature in a dark age. He was the author of several works, published by Father Sirmont, in 1646, 8vo. One of his hymns, beginning

"Gloria, laus et honor tibi sit, Rex Christe Redemptor,"

has been adopted by the Catholic church for the service on Palm-Sunday. Dupin. Gen. Biog.

THEOGAMIA, Θεογαμία, in Antiquity, a Sicilian festival, in honour of Proserpine, which seems to have been instituted in memory of her marriage with Pluto.

THEOGNIS, in Biography, a Greek poet, was a native of Megara, in Attica, and flourished about the year B.C. 546. He has been denominated "Gnomologus," or the writer of sentences; and we have extant a work written by him, without order, consisting of moral maxims or precepts, simply expressed and dedicated to poetical ornaments, verified probably for affilling the memory. Athenaeus reckons him among the advocates for licentious pleasures; and Suidas refers to a work of his composition, entitled "Exhortations" or "Admonitions," which contained various impurities. In the verses that now remain, nothing of this kind appears; so that if the charge be true, they must have undergone callillation. "The Sentences of Theognis" have been often printed by themselves, and with the works of other minor Greek poets. Among the best editions are those of Camerarius and Sylburgius. Volsh Poet. Græc. Gen. Biog.

THEOGONY, formed from Θεός, God, and γόν, genus, birth, offspring, that branch of the heathen theology which taught the genealogy of their gods.

Aeschylus gives us the ancient theogony, in a poem under that title. This poem treats of the origin and descent of the gods; or rather, under the allegorical dress of theogony, represents the formation of the world, and the history of eminent men. The plan of this work is intricate and confused. (See Hesiod.) The writer seems to have made use of several different theogonies, and to have blended them together with little regard to consistency. He also frequently adds, for the sake of poetical ornament, fictions of his own, which have no relation to the history and origin of the world. Arilophanes, in his comedy of "The Birds," has introduced a description of the formation of the world, which was borrowed, without doubt, from the ancient theogonies; but it deferves little attention. All the theogonies make an eternal chaos the origin of all things. Thus Ovid. Met. l. 1. v. 5.

"Ante mare, et terras, et quod tegit omnia caelum.
Unus erat totus natura vultus in orbe,
Quem dixere Chaos, rudis indigilque moles,
Nec quicquum nisi pondus iners, convagilque eodem
Non bene juncturam discordia feminam rerum."

"Ere sea and earth, and heaven's high canopy
Were form'd, great Nature's face was one;
A lifeless, rude, and undigested mass
Of jarring feeds in one wild chaos lay." See Chaos.

Whether, besides this chaotic mass, the ancient theogonies supposed an infinite, active, intelligent principle, who from the first matter formed the universe, is a question that has occasioned much debate. It is evident, upon the most cursory review of the ancient theogonies, that God, the great Creator of all things, is not expresally introduced; but it is doubted, whether the writers meant to exclude him, from their system, or indirectly to suppose his existence, and the exertion of his power in giving motion to matter. In the solution of this question, it ought to be considered, whether the theogonists supposed God to have existed before chaos, and to have created it from nothing; or thought him to have sprung from a pre-existing chaos; or conceived God and matter to have been two co-existing and independent principles; whether they imagined God to have been the soul of nature, informing the eternal mass of matter; or were of opinion, that God forth matter as an emanation from himself; if the latter, whether this emanation was the effect of necessity, or of a free act of volition; whether it was from all eternity, or began at some limited period of duration. It must also be inquired, whether, according to the doctrine of the theogonies, a divine mind interposed in the formation of the world, or the effect was produced by the necessary laws of motion acting upon homogeneous and heterogeneous portions of matter. If the latter of these was their doctrine, it is to be further considered, whether it necessarily follows, that they denied the existence of God, or whether it may not be supposed, that, neglecting all consideration of deity, they only endeavoured to explain the physical formation of the world, by laws originally impressed upon matter by the author of nature.

The theogonies certainly do not suppute God to have been prior in the order of time to matter; they speak of chaos as eternal, and seem to have been wholly unacquainted with the doctrine of creation from nothing. But, on the other hand, they never suppute the Deity to be derived from chaos: for Jupiter is not to be confounded with the Supreme Being, but merely to be considered as the chief of those inferior divinities, who, according to the Grecian theology, were either portions of the divinity, inhabiting and animating parts of nature, or departed spirits of heroes and illustrious beings.
illustrious men, exalted to divine honours. There is no sufficient proof, that Orpheus, Hesiod, or any other Grecian cosmogonist, supposed two independent principles in nature: tor, though they ascribe the origin of evil to Chaos, they might, nevertheless, be of opinion, as we shall find to have been the case with many later philosophers, that matter is derived from God.

There were, perhaps, different opinions among the ancient cosmogonists, concerning the first cause of nature. Some might, possibly, ascribe the origin of all things to a generating force, definite of thought, which they conceived to be inherent in matter, without looking to any higher principle. But it is probable, that the general opinion among them was that which had prevailed among the Egyptians and in the East, and was communicated by tradition to the Greeks, that matter, or chaos, existed eternally with God, and that by the divine energy of emanation, material forms were sent forth from him, and the visible world arose into existence. This principle being admitted, the whole system of the ancient theogonies appears consistent, and a satisfactory explanation may be given of most of the Grecian fables. Upon this supposition, the sum of the doctrine of the theogonies, divested of allegory and poetry, will be as follows:

The first matter, containing the seeds of all future being, existed from eternity with God. At length, the divine energy upon matter produced a motion among its parts, by which those of the same kind were brought together, and those of a different kind were separated, and by which, according to certain wise laws, the various forms of the material world were produced. The same energy of emanation gave existence to animals and men, and to gods who inhabit the heavenly bodies, and various other parts of nature. Among men, those who possessed a larger portion of the divine nature than others, are hereby impelled to great and beneficent actions, and afford illustrous proofs of their divine original, on account of which, they are after death raised to a place among the gods, and become objects of religious worship.

Upon the basis of these notions, it is easy to conceive, that the whole mythological system, and all the religious rites and mysteries of the Greeks, might be founded. Brucker's Hist. Phil. by Enf. vol. I.

Among the most ancient writers, Dr. Burnet observes, that theogony and cosmogony signified the same thing. (See Cosmogony.) In effect, the generation of the gods of the ancient Persians, fire, water, and earth, is apparently no other than that of the primary elements.

THEOLOGICAL CRITICISM. See Criticism.

THEOLOGICAL Prebend. See Prebend.

THEOLOGIUM, formed from θεός, and λόγος speech, or discourse, in the ancient theatre, was a place, or little stage, above that on which the ordinary actors appeared. See Theater.

The theogonium was the place where their gods appeared. It also included the machines on which they depended, and from which they spoke.

There was a theogonium required for the representation of the Ajax of Sophocles, the Hippolitus of Euripides, &c. Scal. Poet. lib. i. cap. 1.

THEOLOGY, compounded of θεός, God, and λόγος discourse, divinity; a science, which instructs us in the knowledge of God, and divine things; or which has God, and the things he has revealed, for its object.

Theology is a science which shews us what we are to believe of God, and the manner in which he would be served.

It is divided into two branches, the natural, and the revealed or supernatural.

THEOLOGY, Natural, is the knowledge we have of God from his works, by the light of nature, and reason.

THEOLOGY, Supernatural, is that which we learn from revelation. See Religion.

THEOLOGY, Poëtic, is the knowledge of the holy Scriptures, and of the signification of them, conformably to the opinions of the fathers and councils; without the assistance of any argumentation. But some will have it, that this ought to be called expository, rather than poëtic.

THEOLOGY, Moral, is that which teaches us the divine laws relating to our manners and actions; in contradistinction to

THEOLOGY, Speculative, which explains and establishes the doctrines of religion, as objects of Faith.

THEOLOGY, Scholastic, or School, is that which proceeds by reasoning; or that derives the knowledge of several divine things from certain established principles of faith. See Scholastic Divinity.

The ancients, according to Varro, Scaevola, and Plutarch, had a three-fold theology; the first poëtic, poëtic, fabulous, which flourished among the poets; and was chiefly employed in the theogony, or genealogy, and history of the gods: to whom all things were attributed, which men, and even the vilest of men, could be guilty of. Nevertheless, the popular religion and worship were in a great measure founded upon that mythology, which run through the whole of their religion, and was of great authority with the people. Many unexceptionable proofs of this are produced by Dr. Leland, in his "Advantage and Necellicity of the Christian Revelation," vol. i. part i. chap. 6.

The second, theological, political, or civil, was that established by the Roman laws, and chiefly embraced by the politicians, priests, and people, as most suitable and expedient to the safety, quiet, and prosperity of the state. This, though not the true, was the vulgar theology, and constituted the public and authorized religion. It was that which the philosophers themselves, whatever private opinions or speculations they might entertain, or dispute of in their schools, universally conformed to in their own practice, and also exhorited others to do so. Varro informs us, that this theology particularly determined what gods they were publicly to worship, what sacred rites they were to observe, and what sacrifices to offer.

Although even the vulgar among the Pagans seem, in general, to have had some notion of one supreme God, yet their theology was properly polytheism; and the providence they acknowledged, was the providence, not of one God, but of many gods. The learned Dr. Cudworth, who seems inclined to put the most favourable construction upon the Pagan theology, acknowledges, that the civil theology, as well as the poëtical, had not only many fantastic gods in it, but an appearance of a plurality of independent deities; several being made supreme in their respective territories or functions. Arifiole (Oper. tom. i. p. 1246. edit. Paris, 1629) intimates, that according to the laws of cities and countries, that is, in the civil or political theology, there seems to be no one absolutely powerful or all-perfect being, but a plurality of gods, one of whom is supposed to be more powerful in one respect, and another in another respect. Besides, the public religion was made up partly of the physical, and partly of the poëtical theology. Those poëtical fables, which Varro cenures as unworthy of the gods, and as ascribing to them actions which none but the vilest of men
THE

men would be guilty of, were not only permitted to be acted on the public theatres, and heard with pleasure by the people, but they were regarded as things pleasing to the gods themselves, by which they were propitiated and rendered favourable; and accordingly they were taken into the public religion. Games were celebrated, and plays were founded upon them; and the public games and plays were on certain occasions considered as acts of religion, encouraged by their deities, and celebrated in honour of them. It is also justly observed, that the images, forms, habits, and ornaments of their gods, their different faces and ages, and the sacred festivals instituted to their honour, had all of them a reference to the fables of the poets and mythologists, and were founded upon them; so that the civil and the fabulous theology might each of them be called civil, and each fabulous. Hence proceeded many absurd and ridiculous, and many immoral and inhuman rites, which were made use of in the worship of their gods, and which were either preferred by the laws, or were established customs, countenanced by the magistrates, and which had obtained the force of laws, and may, therefore, be regarded as belonging to the public religion of the Pagans. See Leland's Christian Revelation, ubi supra, cap. 7.

The third, \textit{natural}, was chiefly cultivated by the philosophers, as most agreeable to nature and reason. The physical or natural theology acknowledged one only supreme God; to which it added \textit{demons} or \textit{spirits}, as mediators between him and man.

Dr. Leland has urged a variety of considerations to prove that, notwithstanding the high encomiums which have been heaped upon the philosophical theology of the Pagans, it was of little use in leading the people into a right knowledge of God and religion, and for reclaiming them from their idolatry and polytheism. To this purpose he observes, that, if the philosophers had been right in their own notions of religion, they could have but little influence on the people, for want of a proper authority to enforce their instructions. The affected obscurity of the Pagan philosophers was another cause which rendered them unfit to instruct the people in religion; to which it may be added, that some of them used their utmost efforts to destroy all certainty and evidence, and to unsettle men's minds as to the belief of the fundamental principles of all religion; and even the best and greatest of them acknowledged the darkens and uncertainty they were under, especially in divine matters. The philosophers themselves were also, for the most part, very wrong in their own notions of the Divinity; they very much corrupted the ancient tradition relating to the one true God and the creation of the world, and endeavoured to account for the formation of all things without the interposition of a Deity. And the opinions of those philosophers who were of a nobler kind, were chargeable with great defects: they generally expressed themselves in the polytheistic strain, and instead of leading the people to the one true God, they spoke of a plurality of gods, even in their most serious discourses; ascribing those works to the gods, and directing those duties to be rendered to them, which properly belong to the supreme. The philosophers likewise referred the people for instruction in divine matters to the oracles, which were managed by the priests; this was particularly the case with Socrates, Plato, and the Stoics.

It was an universal maxim among them, that it was the duty of every wife and good man to conform to the religion of his country; and they not only worshipped the gods of their respective countries according to the established rites, and exhorted others to do so; but when they took upon themselves the character of legislators, and drew up plans of laws, and of the best forms of government, polytheism, and not the worship of the one true God, was the religion they professed to establish. Moreover, they employed their learning and abilities to defend and justify the popular idolatry and polytheism. The worship of inferior deities was recommended by them, under pretence of it tending to the honour of the supreme. Some of the most eminent of them endeavoured to colour over the most absurd part of the Pagan poetical theology, by allegorizing the most indecent fables. They apologized for the Egyptian animal worship, which the generality of the vulgar Pagans in other nations ridiculed. They vindicated idolatry and image-worship, as necessary to keep the people from falling into irreligion and atheism; and besides, some of the more refined philosophers were against any external worship of the supreme God.

Many of the philosophers, and of the learned and polite Pagans, denied a providence. Of those who professed to acknowledge it, some confined it to heaven and heavenly things; others supposed it to extend to the earth and to mankind, yet so as only to exercise a general care and superintendence, but not to extend to individuals; others, again, supposed all things, the least as well as the greatest, to be under the care of providence; but they ascribed this not to the supreme God, who, they thought, was above concerning himself with such things as these, and committed the care of them wholly to inferior deities. See the illustration and proof of these several allegations by Dr. Leland, ubi supra, cap. 10—17.

\textit{Theology, Bachelor in. See Bachelor.}
\textit{Theology, Mystic. See Mystic.}
\textit{Theology, Polemical. See Polemical.}
\textit{Thomastiana, Theophanes, in Antiquity, divination by the supposed inspiration of some deity. For a particular account of which, see Potter, Archæol. Grec. lib. ii. cap. 12. tom. i. p. 298.}

\textit{Theon}, in \textit{Biography}, a mathematician of the Platonic school, was a native of Smyrna, and flourished under the emperors Trajan and Adrian. His mathematical treatises are said to have been written for the purpose of elucidating the philosophy of Plato; and his discourses, treating of geometry, arithmetic, music, astronomy, and the harmony of the universe, may serve to throw some light upon the Pythagorean system. Part only of his work, "De is quæ in Mathematicis ad Platonis sectionem utilia sunt," or that which relates to arithmetic and music, has been published. The remainder, which pertained to astronomy and geometry, is said to have been preferred in the Ambrobian library at Milan. Ptolemy refers to his astronomical observations. Brucker in \textit{Enfield, Montucla Hist. des Math.}

Another mathematician of the same name belonged to the Alexandrian school, and flourished about A.D. 356. He was the father of the learned but unfortunate Hypatia; his works are various among these we may mention his "Recensio Elementorum Euclidis," published by Commandini; his "Oeconomiae Naturae," and Fragmenti Commentarii in Ptolomei Canonem expeditum, five Recensiones fucitans Chronologica regem a Nabinahflarid Antinomum Pius; "Scholia in Aritm," said to be interpolated; and "Commentarius in Magnum Ptolemai Syntaxum," which is incomplete. Montucla.

\textit{Theopaschites, Theopaschite, in Ecclesiastical History}, a sect of heretics in the fifth century, the followers of Petrus Fullenis, or Peter the Fuller, who ulurped the see of Antioch; and after having been several times
times deposed, and condemned, on account of his opposition to the council of Chalcedon, was at last fixed in it, A.D. 482, by the authority of the emperor Zenon, and the favour of Acacius, bishop of Constantinople; whence they are also sometimes denominated *Pullonian*.

Their distinguishing doctrine was, that the whole Trinity suffered in the passion of Jesus Christ. This hereby was embraced by the Eutychian monks of Scythia, or, according to La Croze, of Egypt; who using their utmost efforts to make it obtain, raised great disorders towards the beginning of the following century. It was condemned, at its first rite, in the councils of Rome and Constantinople, held in 483. It was again revived in the ninth century, and again condemned in a council at Rome, held in 862, under pope Nicholas I.

F. le Quien, in his notes on Damascenus, says, that the fame error had been taught before Pullenius, by Apollinarius, whose disciples were the first that were called Theophanes, or Theopaschites.

**THEOPHANES**, in *Biography*, a Greek historian and poet, was of noble extraction, and born at Mitylene, in the island of Lesbos. About the commencement of the Mithridatic war, he is supposed to have come to Rome in his youth; and when Pompey was appointed to the chief command against Mithridates, he took Theophanes with him to record his exploits, procuring for him the citizenship of Rome, and adding to his name those of "Cornelius Balbus." It is also supposed that it was principally on his account, that on his return he visited Lesbos, and restored to the Mitylenians the privileges of which they had been deprived by the Roman senate. At Rome he connected himself with the most distinguished citizens, and he was deputed to Alexandria for the confirmation of treaties of alliance with Ptolemy Auletes. After the defeat of Pompey at Pharsalia, he accompanied him in his flight; and by his advice this commander declined to take refuge with Juba, king of Mauritania, and failed to Egypt, where he met his fate. Theophanes afterwards joined the party of Caesar. The most important of his writings was a "History of the Wars of the Romans, in different Countries under the Command of Pompey." Of this work there remain only five fragments, quoted by Strabo, Plutarch, and Stobaeus; but Plutarch is supposed to have made great use of his authority in his life of Pompey, though he does not speak favourably of his character. He says, "Theophanes affirms, that in the private papers of Mithridates taken at Cannae, there was found a memorial, composed by Rutilius (Rufus), exhorting Mithridates to massacre all the Romans in Asia. But it is generally believed, that this was a malicious fiction of Theophanes to blacken Rutilius, whom probably he hated, because he was a perfect contrast to himself; or it might be invented by Pompey, whose father was represented by Rutilius in his history, as one of the world of men." Rutilius was a man of such excellent character, as to be incapable of the crime with which he is charged; and without doubt such a falsification of history, for base and private purposes, is sufficient to destroy all esteem for the writer.

Of the poetry of Theophanes, which was celebrated in his time, there remain only two epigrams, inserted in the *Anthologia* Vossii. Morei. Gen. Biog.

**THEOPHANES**, George, a Constantinopolitan Greek, of a rich and noble family, married young, but from superlative motives lived in a state of celibacy. He afterwards became a monk. At the general council held in 787, he was present, and was treated with respect. When Nichphorus, patriarch of Constantinople, was exiled by the emperor Leo the Armenian, Theophanes paid him extraordinary honours, and was himself banished to the isle of Samothrace, where he died in 818. His chronicle, commencing where that of Syncellus terminated, was extended to the commencement of the reign of Michael Caphalata. This was printed at Paris, with the Latin version and notes of F. Goar, under the care of Combefis, in 1665, fol. It is valuable for its facts, but displays the credulity and weak judgment of a superstitious mind. *Vollius*. *Gen. Biog.*

**THEOPHANES PROKOPOVITCH**, the son of Procopius, archbishop of Novgorod, a learned Russian historian, and miscellaneous writer, was born at Kiev in the year 1681, and having studied under his uncle Theophanes at the Bratki convent in Kiev, travelled into Italy in his eighteenth year. In three years he completed his course of preparatory study, and then returned to his native town, where he read lectures on the Latin and Slavonian art of poetry, at the seminary where he had received his education. Having assumed the monastic habit, with the name of Theophanes, he was appointed, at the age of twenty-five, prefect of the seminary, and professor of philosophy. By a Latin oration and a sermon, delivered before czar Peter the Great, he attracted his notice, and was chosen his companion in his war against the Turks. In 1711 he was made abbot of the monastery of Bratskoi, rector of its seminary, and professor of divinity. By enfuring the ignorance of the clergy, and endeavouring to excite a taste for literature, he recommended himself to the czar as a proper coadjutor in his plans for re-forming the church. He was accordingly placed at the head of the yod, in the new ecclesiastical establishment, the plan of which he had prepared, and in 1718 he was promoted to the bishopric of Pleskof. In 1720 he was created archbishop of the same diocese, and soon after the accession of Catharine I., he was advanced to the rank of archbishop of Novgorod, and metropolitan of all Russia; and in this station he died in 1730. This prelate was in a high degree the patron of literature, and engaged in a variety of ways, by his personal munificence and labour, in promoting it. His works were sermons and theological tracts, a treatise on rhetoric, and rules for composing Latin and Slavonian poetry, Latin verses, and more especially the Life of Peter the Great, terminating with his battle of Pultawa. Le Clerc affirms that he endeavoured to persuade Peter to introduce the Protestant religion into Russia, and that this event would have taken place, if it had not been prevented by Peter's death. The prelate's education at Rome, and the high rank he sustained in his own church, render this anecdote improbable. *Coxe's Travels in Russia*.

**THEOPHANIA, Θεοφάνεια,** formed of Θεός, God, and Φανερός, visible, in Antiquity, a festival observed by the Delphians upon the day on which Apollo first manifested himself to them.

**THEOPHANY, in Church History,** is sometimes used in the same sense with *Epiphany*.

**THEOPHILA, in Ancient Geography,** a town of India, on this side of the Ganges.

**THEOPHILE, named Vivald, in Biography,** a French poet, was born at Clerae, in the Agenois, about the year 1590. By education he was a Calvinist, but in his conduct and writings he was licentious. In 1619 he withdrew to England, and unsuccessfullly attempted to introduce himself to king James. After his return he abjured Calvinism, but his manners remained the same. On account of a work entitled "Le Paralle Satirique," published in 1622, and attributed to him, in which were several pieces offensive to decency...
decrecy and religion, he was prosecuted. Being arrested in Picardy, he was brought to Paris, and thrown into the dungeon that had been occupied by Ravalliac, where he remained for two years. He was at length released by the parliament, and sentenced to banishment. The duke of Montmorency took him under his protection, and at his hotel he died in 1626. His writings are partly prose and partly verse. His verses are negligent and irregular, but they display genius and imagination. His works consist of odes, elegies, sonnets, &c.; tragedies; a dramatic dialogue on the immortality of the soul, entitled "Socrate Mourant;" apologies for himself, and letters. A collection of his poems and apologies was printed at Rouen in 1627, 8vo.; and his friend Mairet printed his French and Latin letters at Paris, in 1642, with his portrait prefixed. Nouv. Dict. Hist. Gen. Biog.

THEOPHILUS, emperor of Constantinople, was the son of Michael the Stammerer, and succeeded his father in 829. He began his reign with the exercise of justice in its utmost rigour, heedless not only of the claims of gratitude, but of the feelings of humanity. His father had been indebted for his life and crown to the murderers of his predecessor Leo IV. Theophilus, under a preterence of paying the debts of his father to those who had contributed to his elevation, fummoned them, among other considerable persons in the empire, to his presence; and deiring the former to withdraw into an adjoining apartment, that their claims might be examined, he ordered them, on their own confession, to be capitaliy punished. In another cafe, a poor woman threw herself at his feet, complaining of the injury which she had sustained from a powerful neighbour (the empress's brother), who had raised the wall of his palace so high, that his humble dwelling was deprived of light and air. Theophilus gave her the palace, with the ground upon which it stood, and caused the offender to be striped and scourged in the public square of the city. The effect of his singular rigour, though altogether indefensible, was, that a scrutiny of seventeen days could not discover a single crime or abuse in the court or city.

During this emperor's whole reign he was engaged in wars with the Saracens, the detail of which we shall omit. Theophilus died in 842, after a reign of more than twelve years. His zeal against the worship of images has caused his character to be treated with great severity, and his faults to be exaggerated. Although he was inexcusably rigorous in his administration, he was a reformer of manners. Of his superiority to avarice, and high Ideas of the dignity of the regal character, the following anecdote furnishes an instance. Seeing one day a merchant-ship, which was deeply laden, entering the harbour of Constantinople, he ordered the mariners to whom it belonged: they replied, "to the empress." "God has made me (he exclaimed) a prince, and am I your a merchant? If princes trade, their subject must starve!" he then ordered the vessel to be set on fire with all her cargo. Anc. Un. Hist. Gibbon's Rom. Hist.

THEOPHILUS, bishop of Antioch, was ordained to this see in 168 or 170, and governed it for twelve or thirteen years. In his zeal against herey, he wrote against Marcion and against Hermogenes, and he composed other tracts, of which are preferred. We have also extant three books against Autolycus, a learned heathen, in which he displays great learning, and from which it appears that he had once been a heathen. These works afford, as it is said, the earliest example of the use of the term "Trinity," applied by the author to the three persons of the Godhead. Some have supposed that he approaches to Ariana, when he afferts that the Word may exist in place, and that he was gotten in time. Theophilus's books to Autolycus were published in Latin by Conrad Gfner at Zurich, in 1546, and were inserted in the "Orthodoxographia," Balf, 1555. They were annexed in gr. and Lat. to the Supplement of the "Bibliotheca Patrum," 1624; and were printed at the end of St. Justin's Works by Morelle. Lardner.

THEOPHILUS, bishop or patriarch of Alexandria, of violent and turbulent disposition, was ordained to that see in 385. He gained reputation and influence by his zeal in destroying the temple of Serapis, and other pagan temples of Egypt in 389. (See THEODOSIUS.) He was, under the guile of a friend, a secret enemy to John Chrysofom, after he had been ordained to the see of Constantinople in 397. Without much regard for religion, he was the zealous champion of orthodoxy; and having called a council at Alexandria in 399, he prevailed with the assembly to condemn all the followers of Origen, and with the affiance of a band of soldiers, compelled them to abandon their residence on mount Nitria. The poor monks, falling to find a secure refuge, repaired to Constantinople, to lay their complaints before the emperor. The humanity of John Chrysofom irritated Theophilus, who was employed by the empress Eudoxia, for prosecuting her revenge against Chrysofom. Accordingly, he arrived at Constantinople at the head of a body of Egyptian sailors and dependent bishops, avowing that he was going to depose John. His purpose was executed at the synod of Chaledon in 403. (See CHRYSOSTOM.) His malignity pursued this venerable prelate in his exile, by a libel filled with abusive expressions, which was translated at his request by Jerom, from Greek into Latin. Theophilus died at Alexandria in 412. The most confiderable of his works was a large treatise against Origen. Some of his epistles are found among those of Jerom, and some of his canonical epistles are contained in the collections of Zonaras and Balfam. Of this prelate Dupin has given the following character: "There is nothing in the writings of Theophilus that can turn to his commendation; they are obscure, unintelligible, and full of falte and impatient reasonings and reflections. He was a good politician, but a bad author. He knew better how to manage a court intrigue, than to resove a question in divinity. The only rule for his opinions was his interest or his ambition. He was ready to embrace any opinion or party that suited his purpose, without examining whether it was just or reaonable." Dupin. Lardner. Gibbon.


Gen. Ch. Cal. Perianthus inferior, small, of one leaf, in five deep, obtuse, permanent segments. Cor. of one petal, bell-shaped, spreading, cut more than half way down into five rounded equal segments. "Nectary five small, ovate, obtuse glands, thickest at the point, lying upon the segments of the corolla." — Jacq. Stam. Filaments five, thread-shaped, united below to an internal membrane, fo as to form a short, thick, furrowed column, crowned with a five-rayed horizontal disk; anthers five, of two separate oblong lobes,
loves, attached to the sides of each segment of the disk, underneath. *P. fill.* German superior, ovate; style cylindrical, the length of the filaments, erect; stigma in five obtuse lobes. **Peric.** Berry globose, coated, of one cell. Seeds several, roundish, somewhat compressed.

Eff. Ch. Corolla bell-shaped, in five obtuse spreading segments, with a nectary of five incumbent glands. Berry coated, of one cell, with several seeds.

1. *Th. americana.* Large-fruited Theophrastus. Linn. Sp. Pl. 212. Willd. n. 1. Swartz Obsl. 59. (Eresia foliolis aquifolii longijulmis; Plum. Ic. 119. t. 126.)—Leaves obtuse. Clusters terminal, erect.—Native of barren dry bushy stony places in Hispaniola. Swartz. Stem tubby, one or two feet high, erect, simple, leafy in its upper half, round, thorny, clothed with rusty down. Leaves opposite or whorled, on very short stalks, erect, oblong-lanceolate, obtuse, tapers at the base, very rigid, serrated; their ferratures alternately inflexed and reflexed, each tipped with a small, prominent, rigid, black-pointed spine. *Flower-flake* thick, rufous, closely pressed to the stem. Clusters short, terminal, from the midst of the terminal leaves, many-flowered, partial *flower-flake* numerous, short, curved, single-flowered. *Flower* two inches in diameter, yellow, brittle, often for the most part hollow or empty, its receptacle juicy at the bottom. Seeds black, hard, attached by their base. Swartz. We presume the clusters, from Plummer's figure, to be erect, and the seeds numerous.

2. *Th. floribunda.* Small-fruited Theophrastus. Jacq. Coll. v. 4. 136. Hort. Schoenbr. v. 1. 62. t. 116. Willd. n. 2.—Leaves acute. Clusters lateral, drooping.—Native of the Caracas. It flowered in the vase at Schoenbrunn from August till November. The stem is said to be twenty feet high, but always unbranched. Leaves imperfectly whorled, near two feet long, reaching, with spiny ferratures, smooth, of a dark shining green, with numerous transverse veins from the mid-rib. Clusters numerous, scattered between the whorls of leaves, lank, drooping, a span long, of numerous little orange-coloured or scarlet flowers. Fruit in its native country about an inch in diameter, with about four seeds; but in the garden it did not attain more than half that size, and perished only one. If there be no mistake in Dr. Swartz's description of the first species, there is a prodigious difference between the stature of the two. Yet we have a suspicion, that they may possibly not be more than varieties of each other. As to the generic character, Plummer's representation of the parts of the flower is too imperfect for us to suppose him more right than the faithful Jacquin. Swartz's description may easily be reconciled with the *Hortus Schoenbrunnensia.*

THEOPHRASTICS, a name given to the followers of Parmeicus, from his name Theophrastus.

THEOPHRASTUS, in *Biography,* a distinguished Greek philosopher, the favourite pupil of Aristotle, and nominated by him as his successor in the school of the Lyceum, was born at Eresin, a maritime town of Lesbos, in the second year of the 102d Olympiad, B.C. 371. His first rudiments of education were received under Alcippus in his own country, and being sent by his father to Athens, he became first a disciple of Plato and afterwards of Aristotle. Such were his natural talents, that, under such tuition, he made great progress both in philosophy and eloquence: so that his original name, Tyrtamus, was changed, either by his master or his followers, into Theophrastus. After he undertook the Peripatetic school in the year B.C. 323, his reputation was so distinguished, that the number of his scholars was about 2000. His erudition and engaging manners recommended him to the notice of Caffander and Ptolemy; by the former he was invited to Macedon, and by the latter to Egypt; and among the Athenians he was so great a favorite, that, when he was accused by one of his enemies of teaching impious doctrines, the accuser could not without difficulty escape the punishment which he endeavoured to bring upon Theophrastus. Theophrastus is no less highly esteemed for his generosity and public spirit, than for his industry, learning, and eloquence. He is said to have twice saved his country from the oppression of tyrants; and he contributed liberally towards defraying the expense of public meetings held by philosophers for learned and ingenuous conversation. In the public schools he appeared, after the manner of Aristotle, in an elegant dress, and was very attentive to the graces of eloquence: and hence it is said he obtained the appellation of Theophrastus, the divine speaker. Towards the close of life, which was prolonged to the age of 85 years, he became very infirm, and was conveyed to the school in a carriage. In contemplating the shortness of life, he expressed great regret; complaining that long life was granted to flags and crows, to whom it was of little value, but was denied to man, who, if it were of longer duration, might attain the summit of science: whereas now, as soon as he arrives within sight of it, he is taken away. His last advice to his disciples was, that since it is the lot of man to die as soon as he begins to live, they should take greater pains to enjoy life as it passes, than to acquire posthumous fame. A large body of Athenians attended his funeral.

The works of Theophrastus comprehended a variety of subjects, and were numerous. His doctrine differed in some respects from that of his master Aristotle. He taught that the predicaments, or categories, were as numerous as the motions and changes to which beings are liable; and that among motions, or changes, are to be reckoned defiles, appetites, judgments and thoughts. He maintained, that all things are not produced from contraries; but some from contraries, some from similar causes, and some from simple energy; that motion is not to be distinguished from action; and that there is one divine principle of all things, by which all things subsist. By this divine principle, it is thought that Theophrastus meant the First Mover, without whom other things could not be moved, and therefore could not subsist. Of his moral maxims, the following are the most worthy of notice. "Respect yourself, and you will never have reason to be ashamed before others. Love is the passion of an indolent mind. Blustering is the complexion of virtue. Time is the most precious expenditure."

Few of his works, of which Diogenes Laertius enumerates more than 200, have reached our time: of these, the most famous is entitled "Characters," describing different moral classes of men, such as the flatterer, the impudent, the disincontented, the garrulous, the superfluous, &c.; so distinguished and described, as to shew great knowledge of mankind. Of his other works on natural history, the principal are his "History of Plants," in nine books, which Haller has particularly recommended to the notice of botanical students; "On the Causes of Plants," relating chiefly to the natural and artificial means of bringing them to maturity; to agriculture and horticulture; to the tastes and odours of vegetables; "On Stones;" "On Winds;" "On Fire;" "On Honey;" "On the Signs of Fair Weather, and of Tempests and Rain;" "On Animals which change their Colour;" "On Animals which are born suddenly;" "On Fish which live out of Water." Theophrastus ranks amongst the most distinguished of the ancients for comprehensive genius and diligent inquiry into nature. The last edition of the whole extant works of Theophrastus is that

Vol. XXXV.
of Dan. Heimius, Greek and Latin, fol. Lugd. Bat. 1613. Of his history of plants, the most complete is that of Budaeus, Greek and Latin, fol. Amst. 1644. Among the most esteemed editions of his "Characters," which are numerous, we may reckon those of I. Cusabon, of Neder- 

THEOPHYLACT, named Simocatta, a Greek historian, a native of Greece, but of Egyptian origin, flourished about A.D. 612. His history of the reign of the emperor Maurice is comprised in eight books, and terminates with the massacre of this prince and his children by Phocas. Cusabon reckons Simocatta one of the belt of the later Greek historians. The work just mentioned was printed at the Louvre, in 1647, fol. and forms a part of the Byzantine historians. An edition of his "Epitomes, Moral, Rural, and Amatory," was given by Aldus. His "Physical Problems" were published first by Vulcanius at Leyden, and afterwards by Andrew Schottus. His "History of the Habitable World" is cited by Euthamius, in his Commentaries on the Periplus of Dionysius. Gen. Biog.

THEOPHYLACT, archbishop of Acris, the capital of Bulgaria, was a native of Constantinople, and flourished under the emperors Michael Ducas, Nicephorus Botoniates, and Alexis Comnenus. After his elevation to the archbishopric of Acris, by the persuasion of the wife of Ducas, he diligently laboured in propagating the Christian faith, and composed several works, which give him rank among the principal ecclesiastical writers of his age. The time of his death is not known; but he was living in 1071. His "Commentaries on the Four Gospels, the Acts of the Apostles, and the Epistles of St. Paul," which are his chief work, are for the most part abridged from Chryso- 
tom and others. He also wrote "Commentaries on the Minor Prophets." Several editions of his Commentaries have been published in Greek and Latin, and also in Latin only. "Seventy-five Epitomes" of this author were published by Meurinus, in Greek, in 1617, and a Latin translation in 1632. Some other tracts have been attributed to this author. Dupin says, that the Commentaries of Theophylact are very useful for the literal explanation of the Scriptures; and Lardner observes, that he quotes no forged writings or apocryphal books of the New Testament, many of which he excludes by his observation on John, i. 31—34. that Christ wrought no miracle in his infancy, or before the time of his public ministry. Dupin. Lardner.

THEOPNEUSTÆ, Θεόπνευστη, formed of Θεός, God, and πνεῦμα, I breathe, an epithet given to enthusiastic diviners.

THEOPOLIS, in Ancient Geography, a town of Gallia Narbonenensis, belonging to the Aventici, N.E. of Forum Novum.

THEOPROPIA, Θεοπρουπία, formed of Θεός, God, and πρᾶξις, I excel, a designation given to oracles. See Oracle.

THEOPSIS, Θεόπνευσις, formed of Θεός, God, and πνεῦμα, I live, in Mythology, denoted the appearance of gods. Cicero, Plutarch, Arnobius, and Chrysoform, mention appearances of this kind.

THEORÆ, THEORIA, or THEORIA, a musical instrument, made in form of a large lute; except that it has two necks, or juga, the second and longer of which fitts the four leaf rows of chords, which are to give the deepest sounds. See LUTE.

The word is formed from the French teorbe; or theorbe, and that from the Italian teorbe, which signifies the fame, and which some will have to be the name of the inventor.

The theorbo is an instrument which for many years succeeded to the lute, in the playing of thorough basses; it is said to have been invented in France, by the fieur Hottemann, and thence introduced into Italy, &c.

The only difference between the theorbo and the lute is, that the former has eight bass or thick strings twice as long as those of the lute; which excess of length renders their sound so exceedingly soft, and keeps it up so long a time, that it is no wonder many prefer it to the harpsichord itself. At least it has this advantage over it, that it is easily removed from place to place, &c.

All its strings are usually single; though there are those who double the bass-strings with a little octave, or the small strings with an unison; in which case, bearing more resemblance to the lute than the common theorbo, the Italians call it the arcithuto, or arch-lute.

THEOREM, in the Mathematical Method, a proposition which terminates in theory, and which considers the properties of things already made or done.

Or, a theorem is a speculative proposition, deduced from several definitions compared together. Thus, if a triangle be compared with a parallelogram standing on the same base, and of the same altitude, and partly from their immediate definitions, and partly from other of their properties already determined, it is inferred, that the parallelogram is double the triangle; that proposition is the theorem.

Theorem stands contradistinguished from problem.

There are two things to be chiefly regarded in every theorem, viz. the proposition and the demonstration: in the first is expressed what agrees to some certain thing under certain conditions, and what does not.

In the latter, the reasons are laid down, by which the understanding comes to conceive, that it does or does not agree to them.

Theorems are of various kinds: as,

Theorem, Universal, is that which extends to any quantity without restriction, universally. As this, that the rectangle of the sum and difference of any two quantities is equal to the difference of their squares.

Theorem, Particular, is that which extends only to a particular quantity. As this: in an equilateral right-lined triangle, each of the angles is sixty degrees.

Theorem, Negative, is that which expresses the impossibility of any affection. As, that the sum of two biquadrate numbers cannot make a square number.

Theorem, Local, is that which relates to a surface. As, that triangles of the same base and altitude are equal.

Theorem, Plane, is that which either relates to a rectilinear near surface, or to one terminated by the circumference of a circle. As, that all angles in the same segment of a circle are equal.

Theorem, Solid, is that which considers a space terminated by a solid; that is, by any of the three conic sections. E. gr. this: that if a right line cut two asymptotic parabolas, its two parts terminated by them shall be equal. See Solid.

Theorem, Reciprocal, is one whose converse is true. As, that if a triangle have two equal sides, it must have two equal angles: the converse of which is likewise true, that if it have two equal angles, it must have two equal sides.

Theorem, in Algebra and Analysis, is sometimes used to denote a rule, particularly when that rule is expressed in symbols or formulae, of which there is of course a great number; but of these, some few, either from their impor-
Theorem.

Binomial Theorem, or Newtonian theorem, is a general formula for the development of any binomial of the form \((a + x)^n\); viz.

\[
(a + x)^n = \sum_{k=0}^{n} \binom{n}{k} a^{n-k} x^k
\]

and

\[
\binom{n}{k} = \frac{n!}{k!(n-k)!}
\]

See Binomial Theorem.

Briggs's Theorem.—There are more than one formula that have received this designation, but we believe that the following is generally understood to be implied; viz.

"The nth differences of any consecutive nth powers, or of any nth powers whose roots are in arithmetical progression, are expressed by the formula

\[
n(n-1)(n-2)(n-3)(n-4) \ldots 1 \cdot d^n
\]

d being the common difference of the roots."
Theorem.

But since \( n - n = 0 \), the \((n + 1)\)th differences \(= 0 \); and since \( w^2 - w = 0 \), the \(n\)th differences become

\[ n (n - 1) (n - 2) (n - 3) \ldots \cdot 3 \cdot 2 \cdot 1 \text{ d.} \]

It may not be amiss to observe, that we have only employed the first term of the several orders of differences, which however is sufficient for our purpose, since it is obvious that the \(n\)th difference can have but one term; for the development of \((p + d)^n\) gives \(n + 1\) terms; and since one term vanishes with every difference, the \(n\)th difference will have \(n\) terms, the second \(n - 1\), the third \(n - 2\), &c.; and consequently the \(n\)th difference will have \(n - (n - 1) = 1\) term only. See Irish Transactions, vol. xi. or Monthly Review, vol. lxxiv.

Cotes’ Theorem, or Cotesian Theorem.—The geometrical properties of this very interesting theorem are explained under the article COTESIAN Theorem; it will only be necessary therefore in this place to state the theorem analytically. In this case, the general enunciation is:

"All the imaginary roots of the binomial equation \(x^n - 1 = 0\), are contained in the general formula \(x^n = 2\cos \left(\frac{2k\pi}{n}\right)\) and \(\sin \left(\frac{2k\pi}{n}\right)\), and those of \(x^n + 1 = 0\), in the formula \(x^n - 2\cos \left(\frac{(2k + 1)\pi}{n}\right)\) and \(\sin \left(\frac{(2k + 1)\pi}{n}\right)\), \(k\) being any integer not divisible by \(n\), and \(\pi\) representing the semi-circumference."

See Reciprocal Equations.

Euler’s Theorem was used to denote the theorem or formula first given by this author, for ascertaining the direct integrability of differential equations, which is as follows. The equation being reduced to the form

\[ M\, d\, x + N\, d\, y = 0, \]

where \(M\) and \(N\) are functions of \(x\) and \(y\); if \(M\, d\, y = N\, d\, x\), then the integration may be obtained by a direct process; but if this equality has not place, the integration can then only be effected by indirect means, which frequently involve considerable difficulty.

Fermat’s Theorem.—There are several theorems in the theory of numbers which are due to this ingenious analyst; but that which is more particularly designed by Fermat’s theorem is this; viz. "Neither the sum nor difference of any two integral powers, above the square, can be equal to a rational power of the same dimension." Or, which is the same, the equation

\[ x^n \pm y^n = z^n \]

is always impossible in rational numbers, if \(n\) be greater than 2.

The cases of \(n = 3\) and \(n = 4\) have been demonstrated; but notwithstanding the numerous attempts of the most celebrated analysts of the last and of the present age, the case of \(n = 5\), and all the succeeding values of \(n\), remain without demonstration; and as this is now the only theorem of this author which has not submitted to the power of the modern analysts, the National Institute of France has made it the subject of the prize of 3000 francs, to be decided by 1818.

Under the article Numbers, amongst the miscellaneous propositions, we have mentioned another theorem of Fermat’s, which had not then been demonstrated, but which has since been effected by M. Cauchy, corresponding member of the Institute. The reader will also find some farther remarks relative to the equation \(x^n \pm y^n = z^n\), under our article Power.

Gauß’s Theorem is used to denote a theorem invented by this distinguished mathematician, for the solution of certain binomial equations. We have seen, in the article Reciprocal Equations, in what manner the roots of binomial equations may be obtained by means of a table of sines and cosines; but Gauß’s theorem is the converse of this, and shews in what manner the sines and cosines of certain angles may be obtained, by the numerical solution of such equations. See Polygon.

Guldin’s Theorem is the same as the Centrobaric Method; which fee.

Lagrange’s Theorem is commonly used to denote the general formula assumed by Lagrange as the foundation of his theory of functions; which may be thus enunciated.

"If \(z\) be any function whatever of a variable quantity \(x\), and if \(x\) changes its value, and becomes \(x + \delta\), then the \(z(x + \delta)\) may be reprented or resolved into a series of the form

\[ \phi(x + \delta) = \phi(x) + \frac{d\phi}{dx} \delta + \frac{1}{2!} \frac{d^2\phi}{dx^2} \delta^2 + \ldots + \frac{1}{n!} \frac{d^n\phi}{dx^n} \delta^n + \&c. \]

in which the co-efficients of the powers of \(\delta\) are new functions of \(x\), derived from the primitive function \(\phi\), independent of \(\delta\); and, moreover, that every co-efficient is derived from the preceding one, in the same manner as the first \(\delta\) derived from the original function." See Functions.

Leibnitz’s Theorem is a theorem proposed by this author for differentiating under the sign \(\int\), and it may be exhibited under the form

\[ \frac{d}{dx} \int M \, dx = \int \frac{dM}{dy} \, dx, \]

where \(M = \frac{d}{dy} u\) being any function of \(x\) and \(y\).

Since \(u = \frac{d}{dx} x\), by the known principles of the differential calculus; if we make \(u = \int M \, dx\), we shall have

\[ \frac{d}{dx} u = M, \frac{d^2}{dx^2} u = \frac{dM}{dy}, \text{ and integrating with regard to } x, \]

we shall find

\[ \int \frac{d^2}{dx^2} u \, dx = \int \frac{dM}{dy} \, dx = \frac{d}{dy} u + \int \frac{dM}{dy} \, dx. \]

This is called by Leibnitz, differentia et curva in curvam, because in the question which he proposed to resolve, he passed from one curve to another of the same species, by making one of the constant quantities variable. See La Croix "Calculus Integral."

Maclaurin’s Theorem is a formula which we owe to this author for expressing any function \(y\) of a variable quantity \(x\); viz. adopting the differential notation,

\[ y = (y) + \left(\frac{dy}{dx}\right) x + \frac{1}{2!} \left(\frac{d^2y}{dx^2}\right) x^2 + \frac{1}{3!} \left(\frac{d^3y}{dx^3}\right) x^3 + \&c. \]

where \((y), \left(\frac{dy}{dx}\right), \left(\frac{d^2y}{dx^2}\right), \&c.\) represent what these several quantities become when \(x = 0\).

Let \(y = A + Bx + Cx^2 + Dx^3 + \&c.\), differentiating, and dividing by \(dx\), we have

\[ \frac{dy}{dx} = B + 2Cx + 3Dx^2 + \&c. \]

\[ \frac{d^2y}{dx^2} = 2C + 2 \cdot 3Dx + \&c. \]

\[ \frac{d^3y}{dx^3} = 2 \cdot 3 \cdot 4D + \&c. \]
consequently, when $x$ in each of these $= 0$, we have
\[
(y) = A, \left(\frac{d^3y}{dx^3}\right) = B; \left(\frac{d^2y}{dx^2}\right) = C; \left(\frac{dy}{dx}\right) = D;
\]
therefore,
\[
y = (y) + \frac{d}{dx} + \frac{1}{2!} \left(\frac{d^2y}{dx^2}\right) x^2 + \frac{1}{3!} \left(\frac{d^3y}{dx^3}\right) x^3 + \&c.
\]
See Maclaurin’s “Fluxions,” and Boucharlat’s “Calcul Differéncial, &c.”

**Moivre’s Theorem.** See the next article.

\[
(A + A x + A x^2 + A x^3 + \ldots + A x^n)^m = A^m + 3 m A B \left(\begin{array}{l}m \cr 2\end{array}\right) + \frac{4 m A B}{3 A} \left(\begin{array}{l}m \cr 3\end{array}\right) + \&c.
\]

Where $B = A^n$, and $B, B, B, &c.$ are the co-efficients of the terms immediately preceding those in which they first appear; and the manner of applying this theorem to any particular case, is by substituting the numbers or letters in the given example for $A, A, A, &c.$ and the numerical value of $m$ for $m$. It would lead us too far to attempt the demonstration of this theorem in this place, we must, therefore, refer the reader for such information to the works above-mentioned.

**Newtonian Theorem.** See Binomial Theorem.

**Taylor’s Theorem,** an elegant and valuable formula, which was first published by Dr. Brook Taylor in his “Methodus Incrementorum,” which is as follows; viz.

"If $Y$ represent any function whatever of the variable quantity $x$, and if $x$ be increased by any difference $\Delta x$, the value of $Y$, viz. $Y + \Delta Y$, becomes, (employing the differential notation)

\[
Y + \Delta Y = Y + \Delta x \frac{dY}{dx} + \frac{\Delta^2 x^2}{2!} \frac{d^2Y}{dx^2} + \frac{\Delta^3 x^3}{3!} \frac{d^3Y}{dx^3} + \&c.
\]

or $\Delta Y = \frac{\Delta x dY}{dx} + \frac{\Delta^2 x^2 d^2Y}{2! dx^2} + \frac{\Delta^3 x^3 d^3Y}{3! dx^3} + \&c.$

The demonstration of this celebrated theorem is given very concisely by La Croix, on the following principles.

Let $Y$ be any function of $x$, and let $Y'$ denote what this function becomes, when $x$ becomes $x + h$, we may write

\[
Y' = A + B h + C h^2 + D h^3 + \&c.
\]

in which development, it is obvious that $A, B, C, &c.$ are functions of $x$.

If now we difference this equation with $h$ variable and $x$ constant, we obtain, dividing by $d h$,

\[
\frac{Y'}{d h} = B + 2 C h + 3 D h^2 + \&c.
\]

Again, differentiating with $x$ variable and $b$ constant, we have

\[
\frac{Y''}{d x} = \frac{d A}{d x} + \frac{d B}{d x} b + \frac{d C}{d x} b^2 + \frac{d D}{d x} b^3 + \&c.
\]

But as $x$ and $b$ enter exactly in the same manner, it follows that $\frac{d}{d x} = \frac{Y'}{d x} \frac{d}{d h}$ whence the first of these series is equal to the second; equating, therefore, the co-efficients of the like powers of $h$, we have

\[
B = \frac{d A}{d x}, C = \frac{d B}{d x} b, D = \frac{d C}{d x} b^2 + \&c.
\]

Now

\[
A = Y, B = \frac{d Y}{d x}, C = \frac{d^2 Y}{d x^2}, D = \frac{d^3 Y}{d x^3};
\]

whence

\[
Y' = Y + \frac{d Y}{d x} x + \frac{d^2 Y}{d x^2} b + \frac{d^3 Y}{d x^3} b^3 + \&c.
\]

Or writing

\[
Y'' = Y + \Delta Y, x + b = x + \Delta x,
\]

we have

\[
\Delta Y = \Delta x \frac{d Y}{d x} + \Delta x^2 \frac{d^2 Y}{d x^2} + \Delta x^3 \frac{d^3 Y}{d x^3} + \&c.
\]

See La Croix “Calcul Differéncial,” p. 21.

**Trinomial Theorem** is only a particular case of the Multinomial Theorem, which see.

**Wilson’s Theorem** is a curious formula relative to prime numbers, published first by Waring in his “Meditations Algebraicae,” which is as follows.

"If $n$ be any prime number, then will

\[
1 \cdot 2 \cdot 3 \cdot 4, &c. (n - 1) + 1
\]

be divisible by $n$.”

This curious theorem was not demonstrated by Sir John Wilson, who first discovered it, nor by Waring, by whom it was first made public; it has, however, since received different demonstrations from Lagrange, Gauss, &c. the latter of which is very simple, and has been adopted by Darlow in his “Theory of Numbers,” to which work we beg to refer our readers, as it would require more room than we can allow ourselves to give it at full length in this place.

The above include, we believe, all those theorems which are known by any particular designation; there are, doubtless, many others equally important, and which are equally entitled to bear the names of their respective authors, but custom has not functioned the adoption; and we have, therefore, not introduced them.
THEORETIC, Theoretical, or Theoric, formed from theos, $\phi$, or a perception, something relating to theory, or that terminates in speculation. In which sense it stands opposed to practical.

The sciences are ordinarily divided into theoretical, as theology, philosophy, &c.; and practical, as medicine, law, &c. See Science.

Theorétique, Théorétique, is an appellation peculiarly given to an ancient sect of physicians, contradistinguished by it from the empirics. See Empiric.

Theoretic physicians were such as applied themselves to a careful study and consideration of what relates to health and diseases; the principles of the human body, and its structure and parts, with their actions and uses; whatever befals it, either naturally or preternaturally; the differences of diseases, their nature, causes, signs, indications, &c.; the textures, properties, &c. of plants, and other medicines, &c.

In a word, the theoretic physicians were such as proceeded in their judgment and practice on the foot of reason, in opposition to the empirical physicians, who proceeded wholly on experience. See Medicine.

Theoretical Arithmetic and Philosophy. See the sub-

Theor. $\phi$, in Antiquity, an appellation given to the Athenians who performed the solemnity called theoria.

Thoria. $\phi$, a solemn annual voyage to Apollo's temple, in the island of Delos, performed by the Athenians always in the same ship in which Theseus went. For the particularities of this naval procession, see Potter Archzol. Græc. lib. ii. cap. 9. tom. i. p. 284, &c.

Theorick Money, in Ancient Authors, was what was raised, by way of tax on the people, to defray the expenses of theatrical representations, and other spectacles.

There were particular quitters and treasurers of the theoretic money. By a law of Eubulus, it was made a capital crime to pervert the theoretic money to any other use; even to employ it in the occasions of war.

Theorical Astronomy, is that part of astronomy which considers the true structure and disposition of the heavens, and heavenly bodies; and accounts for their various phenomena therefrom. See Astronomy.

It is thus called, in opposition to that part which considers their apparent structure, or their disposition as viewed by the eye, which is called spherical astronomy.

The several parts of theoretical astronomy, fee under Systems, Sun, Star, Planet, Earth, Moon, Satellite, and Comet.

Theory, a doctrine which terminates in the sole speculation, or consideration, of its object, without any view to the practice or application of it.

To be learned in an art, &c. the theory suffices; to be a matter of it, both the theory and practice are required. Machines, many times, promise very well in the theory, yet fail in the practice.

We say, theory of the moon, theory of the rainbow, of the microscope, the camera obscura, the motion of the heart, the operation of purgatives, &c.

Theories of the Planets, &c. are systems or hypotheses, according to which the astronomers explain the reasons of the phenomena or appearances of them. See System.

Theory, in Music, in the hands of a mere mathematician is confined only to ratios and the philosophy of sound. (See Harmonics.) But among practical musicians, the theory of harmony or composition is connected with the combination of agreeable sounds, and the practice and performance of real music.

Theory, Atomic, in Chemistry, the means of explaining the composition and decomposition of chemical bodies, by considering their ultimate atoms or particles as peculiar and distinct elementary solids, never changing in their figure, weight, or volume, under any circumstances.

It would be difficult to conceive the existence of any compound, without supposing it to have originated by union, in some way or other, of particles of its elementary constituents: but the prevalence of a doctrine, which has been generally advanced by mathematicians, viz. the infinite divisibility of matter, has never allowed philosophers to conclude that the circumstance of compounds being made up of particles, must necessarily limit the proportions in which the elements combine. If the elementary bodies be conceived infinitely divisible, the molecules, or compound particles, may be conceived infinitely small, and the number of mean compounds existing between any two given extremes may be also considered infinite.

If such were the nature of elementary matter, and no other causes interfered, there could be no limitation to the proportions in which simple matter would combine. This, however, is contrary to fact; as it is a fact known from the earliest dawns of chemical knowledge, that bodies are limited in the proportions of their elements; the most striking of these facts being the mutual saturation which takes place between an acid and an alkali, and the uniform proportions afforded in the analysis of many native compounds.

Philosophers were always satisfied to consider this fact of the limitation of the proportions of bodies as one of the hidden secrets of nature, as difficult to conceive as the nature of the attraction by which their elements were held together. Berthollet appears to have been the first to attempt this arduous task, in his ingenious work, entitled "Chemical Statics." He supposes that the particles of bodies, when brought within the sphere of attraction, combine without contact till the compound assumes some definite form, by which it is withdrawn from the situation in which it was formed. He supposes the chemical affinity of bodies to be distinct from that power on which their cohesion depends, and also that power by which they tend to an elastic state.

Hence he concludes, that every solid compound is determined by the cohesion which takes place at some limit in the proportion of its elements; such he supposes to be the case with fats and other crytallizable compounds. On the other hand, he supposes the limitations of the proportions of the elements of gaseous compounds to arise from the elastic form which they assume in certain stages of combination. This hypothesis was supported by so many striking facts, that it was thought by some to explain in general the cause of limited proportions. All agreed, that whatever might be the true theory, the causes pointed out by Berthollet had considerable influence in the composition and decomposition of bodies, but they faw at the same time numerous cases in which this hypothesis failed to explain the facts.

Chemists have, from the earliest times, been acquainted with those points of limitation which we call mutual saturation, and have been long familiar with those limited augmentations of their proportions, called by some dozes and by others particles. Among the oxys of metals, which had been little examined before the time of Lavoisier, it was found, that instead of having an infinite number of means between the lowest and highest stages of oxydation, only a certain number of oxys of each metal could be formed, in which the ratio of the metal to the oxygen is uniform. Many of the fats in the same way are formed by limited dotes of acid. Some of the facts in the latter have been explained on Berthollet's hypothesis, while its application
THEORY.

to the former facts is totally insufficient. Long previous to the true cause of these limited doses, the facts were so conspicuous, that a decided nomenclature was adopted for the purpose of expressing these different stages of combination. The oxides have been distinguished by the Greek numerals prot, deut, trit, &c. The fats containing two doses of acid have been called super-falts; and those containing an extra dose of base, have been called sub-falts.

Although chemists have frequently used a language which appeared to furnish their acquaintance with the real cause of the definite proportions, such as one compound being formed by one proportion, dose, or particle of one of its elements, and another with two proportions, doses, or particles: on the other hand, we find expressions which would favour the idea of indefinite proportions; such as bodies losing a small portion of their oxygen, or absorbing a little oxygen from the atmosphere. Salts are sometimes said to contain a slight excess of acid, or a small excess of base.

The most decided language used in any chemical work before the discoveries of Mr. John Dalton, giving any idea that the doses are limited by distinct atoms, will be found in a work by Mr. Higgins, entitled "A Comparative View of the Phlogistic and Antiphlogistic Theories." We beg leave to correct a mistake in a former article, in which we have entitiled this work a Treatise on Phlogiston.

This work was written for the express purpose of combatting the phlogistic theory, and principally in answer to Mr. Kirwan's treatise of phlogiston. In order to show the contradictions and absurdities of the phlogistic doctrine, which, under the name of phlogiston, confounded a number of bodies which were very different, he exhibited by diagrams a number of chemical operations, in which he supposed the elementary bodies concerned to be ultimate particles, and their immediate compounds molecules. He in the same diagrams also used numbers, which he supposed to be elements of the strength of affinity of the combining particles. By this means he very successfully showed many of the inconsistencies which must be admitted to explain the phenomena on the phlogistic theory. In this mode of proceeding, however, the numbers expressing the relative attractions, served his purpose much more than the consideration of the proportions being caused by distinct atoms; and the language which would induce the belief that he had such a conception of the nature of elementary matter, occurs only in a very few parts of his work.

After concluding that it is unnecessary to admit the existence of the imaginary substance phlogiston in sulphur, he concludes, in page 36, that sulphurous acid is composed of one ultimate particle of sulphur with one of oxygen, and that sulphuric acid consists of one of sulphur and two of oxygen.

In the same page he also observes, that water is formed by one ultimate particle of water united to one of oxygen.

In page 81, he supposes sulphuretted hydrogen to consist of nine ultimate particles of sulphur with five of hydrogen. Previous, however, to this conclusion, he believes that the sulphur and hydrogen are not chemically combined, but that the sulphur is dissolved in hydrogen, as a salt dissolves in water.

After using arguments to shew, in answer to Mr. Kirwan, that the nitric acid does not contain what was thought to be phlogiston, he concludes, in page 132, with giving what he conceives to be its constituents, viz. that the nitrous oxide consists of one ultimate particle of azote and one of oxygen; nitrous gas, of one of azote and two of oxygen; red nitrous vapour, one of azote and three of oxygen; straw-coloured nitrous acid, one of azote to four of oxygen; and lially, that the nitric acid is constituted by one of azote and five of oxygen. These facts are certainly very remarkable, as they agree with the conclusions in the present time, and give a strong proof of Mr. Higgins's genius at the time he wrote.

He does not, however, lay any stress upon these remarks, and was not probably aware that they would be confirmed by future research. We are induced to think no, from the manner in which he expresses himself in other parts of his work, in which he frequently speaks of the absorption of small portions of oxygen, and of bodies having a small portion of oxygen more than they can retain. This vague manner of speaking, and others which we do not immediately recollect, is sufficient to shew that Mr. Higgins had no fixed notions of the cause of definite proportions, and that the language in which he has used the words ultimate particles and molecules, was employed rather with a view to illustrate his examples, than to broach any new theory to explain indefinite proportions. Indeed it would have been inconsistent to have treated two subjects, so very different in their objects, in the same pages.

As a proof that there was nothing striking in the remarks in which the words ultimate atoms and molecules are mentioned, we only need refer to the article which Mr. Higgins himself quotes from the Analytical Review, written some time after the appearance of the work in question. The reviewer gives him the highest praise for the able manner in which he has refuted the doctrine of phlogiston, but does not even hint at his diagrams or the ultimate particles. Indeed we can venture to assert, that if no more had been said on the subject of definite proportions than is to be found in this work, we might yet have been as much in the dark as we were twenty years after the publication of Mr. Higgins's "Comparative View."

It was not enough to know that compound bodies were formed of particles, to enable us to explain the cause of definite proportions; and we want no greater proof of this, than the fact of the true cause not being known till twenty-eight years after Mr. Higgins had told us that one particle of sulphur and one of oxygen formed sulphurous acid, and that one to two formed sulphuric acid. These loose expressions were but a small step indeed towards the discovery of the atomic theory in its present form, which has placed chemistry on the same ground with that on which the discovery of the laws of gravity placed the science of astronomy.

We are inclined to believe that the first step towards this important discovery was given by Richter. He found, in the double decomposition of salts, that the acid of one salt was always just sufficient to saturate the base of the other, and nitre of another. He also ascertained, that when one metal was precipitated by another, the oxygen of the precipitated metal was just what was required by the precipitating metal.

The inference to be drawn from these facts was, that if A combine with x to saturation, and B with y to the same; then, if A should be found to saturate y, B would also saturate x. This inference may be still further extended; for if A be a body capable of combining with B, they will mutually saturate each other.

It is the means of drawing these inferences arising from the mutual fitness of those parts of bodies which combine, that constitutes the importance of the atomic theory, and it is for the establishment of this new principle that we are indebted to Mr. John Dalton. When Mr. Higgins can shew, from the data given in his work, that similar inferences
Theories could be drawn, he then will be entitled to share in the merit of the discovery of the atomic theory. We say share with him, for we are firmly convinced that Mr. Dalton had never read Mr. Higgins’s book previous to the publication of his own work.

We perfectly recollect the time, not more than four or five years ago, even when Mr. Dalton’s book was before the public, very few chemists understood the true spirit of the atomic theory; and those who conceived they did understand it, in general discarded it. All know that he considered compounds to be formed of atoms united 1 to 1, 1 to 2, 1 to 3, etc.; but it was not till the reciprocal fitness of these atoms with each other was found to agree with analysis, that it was generally received. When they saw that the numbers, which Dalton called the weights of the atoms, expressed the simple proportions in which bodies combine, they knew it could not be the effect of chance, and have willingly joined in the research. It is for this part of the discovery that Mr. Dalton justly merits the fame he has acquired.

We have given all the facts on which Mr. Higgins could possibly found his claim to the discovery; and we must leave it to our readers to judge, whether they contain the smallest data on which to establish what in the present time we call the atomic theory.

In all the chemical articles since the article Iron, we have had the greatest confidence in the atomic theory; and we have never failed to compare the analyses of different authorities with the results given by theory. We have in general found, that these results have been nearer to the belief of these authorities, than they have been to each other.

We have already given an outline of the atomic theory, with a table of the weights of the simple atoms, and another of some of the most conspicuous compounds, in our articles Definite Proportions, and Simple Bodies.

The French chemists have adopted the atomic theory under another form, which will be found to agree with the language given by Berzelius, who uses the word volume for atom, as we have already explained in the article above alluded to.

Gay Lussac several years ago published a new law respecting the combination of gaseous bodies. He held that gases which combine chemically, either unite in equal volumes, or 1 to 2, or some multiple of 1, by a whole number. Although a number of facts seemed to agree with this law, the truth of it was doubted by some chemists, and principally because no apparent reason appeared for such a law.

In flating (under the article Proportions) the notion of Berzelius respecting volumes, we have pointed out a curious coincidence between the specific gravity and the weight of atoms of the gases, which has since been confirmed by Dr. Prout in Dr. Thomson’s Annals. In order that the weights of the atoms may be equal to their specific gravities, we have there stated, that the number of particles in equal volumes of all gases must be equal, and the distance between the centres of the particles of all gases the same, so that the weights of equal volumes of different gases, would be as the weights of the atoms.

This would also require, that the attraction between the particles should either be the same in all, or that it should be nothing; and the distance of the particles be at points where the repulsion of the caloric atmosphere is balanced by the incumbent pressure.

The flate here supposed, however, is not the case, since we find that the weights of the atoms of the gases generally are not equal to the specific gravity, when reduced to the same standard, although it is strictly the case with a great proportion of them. And in those cases where they are not equal, the one is said to be some multiple of the other, by a whole number.

This circumstance favours the hope that some general law exists, by which the weights of the atoms of bodies are intimately connected with their specific gravities in the elastic form. When the specific gravity is double the weight of the atom, as is the case with oxygen, we have to suppose, that the particles are nearer each other in the proportion of 2 to 1, or that two particles come together, and are surrounded by the caloric, which belongs to one of them in their single state.

It would appear that the oxygen puts on this single state of existence in the formation of carbonic acid, because that gaseous body contains only one atom of oxygen; hence its specific gravity is the same as if it were formed from a gaseous oxygen of half the real specific gravity united to an atom of carbon without any change of volume, the same as takes place when sulphur or carbon is burned in oxygen gas. Hence we may explain the great tendency that oxygen has to combine in double doses with bodies, as is the case with carbon, sulphur, phosphorus, iron, and many other bodies.

We have also an infallence of a compound gaseous body becoming of double the specific gravity which would be expected in oleaceous gas, which is composed of an atom of carbon and an atom of hydrogen. The specific gravity (hydrogen being 1) ought to be $1 + 5.4 = 6.4$; but in fact it is about the double of this. Hence we should conclude, that the repulsion between the particles is halved, or that the compound atoms have united in pairs, by which the densit is doubled.

Theory of the Manufacture and Production of Bread, in Rural Economy, the explanation of the principles and practices on which it depends in different cases. The means which are employed in such cases are mostly well understood; but the principles upon which they depend are far from being so well known. The writer of a late work on the Elements of Agricultural Chemistry, has, however, thrown some light on this hitherto intricate subject. He has noticed, that a number of the changes taking place in the vegetable principles, depend upon the separation of oxygen and hydrogen as water from the compound; but that there is one of very great importance, in which a new combination of the elements of water is the principal operation: this is in the manufacture of bread. When any kind of flour, which consists principally of starch, is made into a paste with water, and immediately and gradually heated to about 440°, it increases, it is said, in weight, and is found entirely altered in its properties; it has lost its solubility in water, and its power of being converted into sugar. In this state it is unleavened bread.

And when the flour of corn, or the flour of potatoes, mixed with boiled roots of the same kind, is made into a paste with water, kept warm, and suffered to remain thirty or forty hours, it ferments, and carbonic acid gas is diffused from it, and it becomes filled with globules of elastic fluid. In this state it is raised dough, and affords by baking leavened bread; but this bread, it is said, is sour and disagreeable to the taste; and that leavened bread for use is made by mixing a little dough that has fermented, with new dough, and kneading them together, or by kneading the materials for the bread with a small quantity of yeast.

It is flated, that in the formation of wheaten bread, more than one-fourth of the elements of water combine with the flour;
flour: that more water in proportion is consolidated in the formation of bread from barley, and still a larger quantity in that from oats; but that the gluten in wheat, being in much larger quantity than in other grain, seems to form a combination with the flour and water, which renders wheat bread more digestible than other species or kinds of bread.

On this principle too it is probable, that this sort of bread may be more suitable and proper for the less laborious classes of society, though the other kinds may be equally or more nourishing and saluting for those who are engaged in hard work.

THEOSOPHISTS, the denomination of a class of philosophers, who profess to derive their knowledge of nature from divine revelation. Not contented with the natural light of human reason, nor with the simple doctrines of scripture understood in their literal sense, these persons have recourse to an internal supernatural light, superior to all other illuminations, from which they pretend to derive a mystic and divine philosophy, manifested only to the chosen favorites of heaven. They boast, that, by means of this celestial light, they are not only admitted to the intimate knowledge of God, and of all divine truth, but have access to the most sublime secrets of nature. They ascribe it to the singular manifestation of divine benevolence, that they are able to make such an use of the element of fire, in the chemical art, as enables them to discover the essential principle of bodies, and to dissolve insipid mysteries in the phyzical world. (See Fire Philosophers.)

They pretend to an acquaintance with those celestial beings, which form the medium of intercourse between God and man, and to a power of obtaining from them, by the aid of magic, alchemy, and other similar arts, various kinds of information and assistance. This they affirm to have been the ancient secret wisdom, first revealed to the Jews under the name of Cabbala, and transmitted by tradition to posterity. Philosophers of this class have no common system; but every one follows the impulse of his own imagination, and constructs an edifice of fanaticism for himself. They only agree in abandoning human reason, and pretending to divine illumination. Many traces of the spirit of Theophosthism are to be found in the whole history of philosophy, in which fanatic and hypocritical pretensions to divine illumination frequently occur. Among moderns, the first name that is mentioned with any distinction in this class of philosophers is Paracelsus. (See his biographical article.) He was succeeded by Robert Fludd, who compounded into a new mass of absurdity all the mysterious and incomprehensible dreams of the Cabbalists and Paracelsians. He ascribed two universal principles, the northern or condensing power, and the southern or rarefying power; and over these he placed innumerable intelligences and geniuses, and called together whole troops of spirits from the four winds, to which he committed the charge of diseases. (See his article.) Another dazzling luminous in the constellation of Theosophists was Jacob Behmen. See Behmen.

A more scientific Theosophist than Behmen was Van Helmont. (See Helmont.) The most elegant and philosophical of all the Theosophists was Peter Poiret, who was born at Metz in the year 1646, and educated in the academy of Bafil. In 1668 he became a student in the university of Heidelberg, with a view of qualifying himself for the clerical profession, and in 1672 he assumed the character of an ecclesiastic in the principality of Deux-Ponts. After a severe fit of ill health, he wrote his "Cogitationes Rationales de Deo, Anima, et Malo," in which he mostly followed the principles of Des Cartes, having in his youth studied the Cartesian philosophy; a work which he defended against the censures of Bayle. Being obliged by the public tumults to withdraw from his clerical cure, he removed to Holland, and afterwards to Hamburg, where he became acquainted with the celebrated mystic Mad. Bouignon, and cultivated himself in the number of her disciples. Abandoning Cartesianism, and fascinated with Bouignonian mysticism, he rejected the light of reason as useless and dangerous, and inveighed against every kind of philosophy that was not the effect of divine illumination. Towards the close of his life he settled at Rheinsburg, in Holland, and employed himself in writing mystical books, such as his treatises "De Economia Divina," "De Eruditione Tripli," and the last edition of his "Cogitationes Rationales." He died in the year 1719. Some of his mystical notions may be collected from the preliminary dissertation prefixed to his works: they are such as these: "It hath pleased God, in order that he may enable a vivid and delightful contemplation of himself, by yond that solitude which belongs to the divine efficacy, to create external beings in whom he may produce an image of himself. The essence of the human mind is 'thought'; capable and dirious of light, and joyful complacency; the properties in which it bears a resemblance of the divine essence. Nothing is more intimate or essential to the mind than this divinity; by which it is borne always towards the true and infinite good. In order to satisfy this divinity, the illumination of faith is necessary; by means of which the mind, conscious of its weakness and impotence, deifies all the fictions of human reason, and directs itself towards God with an intense and ineffable ardor, till, by the intense contemplation of him, it is filled with tranquilizing light and joyful complacency; although, whilst oppressed with the weight of mortality, it cannot behold his unveiled face. From this divine illumination proceeds the most pacific felicity of mind, the most ardent love of God, and the most intimate union with him."

To the class of Theosophists it has been usual to refer the entire society of Rosicrucians; which see.

It will be sufficient to observe, at the close of this article, that the whole system of Theosophism is founded in delusion, and that it is injurious both to philosophy and religion. These supposed illuminations are to be ascribed either to fanaticism or to imposture. The fanatical conceptions, with which these pretenders to divine wisdom have treated those who are contented to follow the plain dictates of common sense, and the simple doctrine of scriptures, has unquestionably imposed upon the credulous vulgar, and produced an indifference to rational inquiry, which has obstructed the progress of knowledge. And their example has encouraged others to traduce philosophy and theology in general, by representing them as resting upon no better foundation than enthusiasm and absurdity. It is to be charitably presumed, that these deluded visionaries have not been themselves aware of the injury which they have been doing to the interests of science and religion. Nevertheless, it must be regretted, both on their own account, and on account of the multitudes they have misled, that whilst they have thought themselves following a bright and steady luminous, they have been led astray by wandering meteors. Brucker by Endfield.

THEOTOCUS, Deipara. See Mother of God.

THEOXENIA, Θεοξενία, in Antiquity, a festival in honour of all the gods, and celebrated in many cities of Greece, but especially Athens.

THEOXIN Malagma, the name of a sort of cataplasm, good against pains of the feet.

THÉRA, in Ancient Geography, one of the islands called Sporades.
Sparades, in the Ægean seas, between the island of Crete and the Cyclades. It is said to have taken its name from Theras, a prince of the race of Cadmus, who removed from Lacedæmon into this island, which was occupied by the descend-ants of the Membrarini, who had possession of it 1550 years before our era; whereas Pliny says that it first appeared in the fourth year of the 135th Olympiad. This island is now called Southampton; for it was also, a town of the island of the same name.—Also, a town of Asia Minor, in Caria, between Idyamus and Pythius.—Also, a town of Asia, in Sog-diana.

THERAMBUS, a town of Macedonia, in the peninsula of Pallene.

THERAMNE, a town of Asia Minor, in Lycia; con-fecrated to Apollo.

Therapeutæ, σημανοῦσα, a Greek term signifying servants, more especially those employed in the service of God. The Greeks gave the appellation therapeutæ to such as applied themselves to a contemplative life, whether it were from the great concern they had for their souls, or from the particular mode and manner of their religion; the word σημανοῦσα, whence therapeutæ, signifying the care a physician takes of his patient, or the service any one renders another.

Philo, in his first book of the Contemplative Life, relates, that there were a people spread throughout most of the known world, but particularly throughout Egypt, and about Alexandria, who renounced their friends, their goods, &c. and who, after discharging themselves of all temporal concerns, retired into solitary places, where they had each their separate mansion, called semnium, or monastery, and placed their whole felicity in the contemplation of the divine nature.

The principal society of this kind was formed near Alexandria, where they lived, not far from each other, in separate cottages, each of which had its own sacred apartment, to which the inhabitant retired for the purposes of devotion. After their morning prayers, they spent the day in studying the law and the prophets, endeavouring, by the commentators of their ancestors, to discover some allegorical meaning in every part. They also amused themselves with composing sacred hymns in various kinds of metre. Six days of the week were thus passed in solitude. On the seventh day they met, decently clothed, in a public assembly, where, feated according to their age, they held the right hand betwixt the breasts and the chin, and the left at the side. Then one of the elders, stepping to the middle of the assembly, discoursed, gravely and calmly, on the doctrines of the sect; the audience remaining silent and occasionally expressing their approbation by a nod. The chapel in which they assembled was separated into two apartments, one for the men, the other for the women. At the close, the speaker sung a hymn of praise to God, in the last verse of which the whole assembly joined. On great festivals, sacred music was performed, accompanied with solemn dancing; and these vigils were continued till morning, when the assembly, after a morning prayer, in which their faces were directed towards the rising sun, was broken up. Such was their abstemiousness, that they commonly ate nothing before the setting sun, and often fasted two or three days. They wholly abstained from wine, and their ordinary food was bread and herbs.

There are two points relating to these therapeutæ exceedingly controverted among critics, viz. 1. Whether they were Jews or Chriftians; and 2. If they were the latter, whether they were monks or seculars? Mosheim affirms, that the therapeutæ were neither Chriftians nor Egyptians, as some have erroneously imagined; they were undoubtedly Jews; nay, they gloried in that title, and styled themselves, with particular affectation, the true disciples of Mofes, though their manner of life was equally repugnant to the institutions of that great lawgiver, and to the dictates of right reason, and shewed them to be a tribe of melancholy and wrong-headed enthusiasts.

Calmet also, in his Dictionarv of the Bible, alleges a variety of reasons to prove, that the therapeutæ were Jews and not Chriftians; and that they were not monks in the fene which ecclefsiatical writers affix to this term. Some have imagined that they were judaizing Gentiles; but Philo, by claffing them with the Essenes, evidently supposes them to be Jews. Others have maintained, that they were an Alexandrian fect of Jewish converts to the Chriftian faith, who devoted themselves to a monafic life. But this is impossi-ble; for Philo, who wrote before Chriftianity appeared in Egypt, speaks of this as an established fect. From a com-paration of Philo's account of this fect with the flate of philo-sophy in the country where it flourished, we may reason-ably conclude, that the therapeutæ were a body of Chriftian fanatics, who suffered themselves to be drawn aside from the simplicity of their ancient religion by the example of the Egyptians and Pythagoreans. It is uncertain how long this fect continued; but it is thought not improbable, that, after the appearance of Chriftianity in Egypt, it soon be-came extinct. See ESSENES.

Therapeutæ, Therapeutä, σημανούσα, formed from σημανοῦσα, to attend, to nurse, cure, &c. that part of medicine which is employed in seeking out remedies against diseases, and in prescribing and applying them to effect a cure.

Therapeutæ teaches the use of diet, pharmacy, surgery, and the methodus medendi.

Therapeutæ is also used figuratively, in speaking of the mind, and of discourses made to correct the errors and defects of it.

Such is the Therapeutæ or Therapeutics of Theodoret; being a treatiie against the errors of unwholofome opinions of the Greeks, i. e. the heathens.

Theraphim, or Teraphim, an Hebrew term, which has given great exercise to the critics. We meet with it thirteen or fourteen times in Scripture, where it is com-monly interpreted idoles; but the rabbins are not contented to have them simply signify idols, but will have it denote a peculiar sort of idols or images intended for the knowledge of futurity, i. e. oracles.

R. David de Pomis observes, that they were called theraphim, from σημανοῦσα, to have, because people quitted every thing to consult them.

Others hold, that the theraphim were brazen instruments which pointed out the hours and minutes of future events, as directed by the stars.

R. Eliezer tells us the reason why the rabbins will have the theraphim to speake, and render oracles: it is, says he, because it is written in the prophet Zechariah, x. 2. "The theraphim have spoken vain things."

The same rabbins adds, that to make the theraphim, they killed a first-born child, clove his head, and seasoned it with salt and oil; that they wrote on a plate of gold the name of some impure spirit, laid it under the tongue of the dead, placed the head against the wall, lighted lamps before it, and prayed to it, and that it then talked with them.

Vorlifius also observes, that, beside the passage of Zechariah, juft quoted, it appears likewise from Ezekiel, xxi. 27. that the theraphim were consulted as oracles.

F. Kircher directs us to seek the origin of the theraphim in
in Egypt; adding, that the word is Egyptian. Spencer, in his dissertation on the urim and thummim, maintains the word to be Chaldee, and to signify the name with ephraim: the Chaldeans being frequently known to change the y into j, that is into i. He adds, that those images were borrowed from the Amorites, Chaldeans, or Syrians; and that the Seraph of the Egyptians is the same thing with the theraiph of the Chaldeans. See Seklen de Dios Syris, fyst. i. cap. 2.

Calmet observes, that the figure of a winged serpent, called šeraph, whence the name seraphim, has given rise to the appellation theraiph, because in the abraxas and other talismans of the ancients, which are real theraiphims, we find the figures of serpents both with and without wings; whence he infers, that the theraiphims of Laban, which were stolen by Rachael, were real talismans. Jurieu conjectures, that these theraiphims were the penates, or household gods of Laban, which, he says, were the souls of the heroes of families, deified and worshipped; and he adds, that the theraiphims of Laban were the images of Noah, the refoter of the human race, and of Shem, the chief of the family of Laban. But Calmet, in reply to this conjecture, observes, that it is by no means credible, that the worship of the penates and lares was known in the time of Laban; and that it is not likely, that Laban should have ranked among the gods Noah and Shem, who had died so near his own time; for Noah died A.M. 2106, and Shem A.M. 2158, about eighty-seven years before Jacob came to Mesopotamia after Laban.

THERAPIGON, in Botany, a name given by some authors to the common oyster-green, or sea-laver, a substance of the tremella kind.

THERASIA, in Geography, a small rocky island in the Grecian Archipelago, separated from the N.W. coast of Sclater (the ancient Thera) by a narrow channel, which forms a secure harbour for boats: 3 miles N. of St. Nicola. Thera is said by Tournefort and Sommier to be the present Alpronif (which fee); but Oliver mentions them as distinct islands. Thera is, in the same, supposed to be the principal town, and which Pliny conjectures, with reason, to have been detached from Thera, cannot be taken for Alpronif, nor the latter for the former, as Tournefort imagines. Alpronif is not large enough to have upon it the smallest village, or the smallest habitation; whereas Thera has sufficient extent, and its territory is sufficiently good, to have been always the fide of a town, as one is still to be seen there at the present day.

THERESA, a river of Africa, which runs into the Atlantic, S. lat. 13°.

Theresa, Order of Maria, a military order instituted by the empress-queen in Germany, on the 18th of June, 1757, and composed of two classes, viz. grand crosses and knights. To thesee the emperor Joseph III., in the year 1765, added an intermediate class, under the appellation of commanders. The number of knights is not fixed, and the emperor is grand-master. The badge of the order is, "a crof of gold, enamelled white, edged with gold;" on the centre of the arms of Austria, viz. "gules, a fette argent, encircled with the word Fortitudinis;" on the reverse is "a cipher of the letters M.E.F. in gold, on an enamelled green ground." The badge is worn pendant to a stiffened crimson and white ribbon.

THERGUSIS, in Ancient Geography, a town of Asia, in the interior of Mesopotamia, situated on the bank and towards the source of the river Chaborras.

THERIACA, Seriaca, Treads, in Medicine, a name given by the ancients to various compositions esteemed good against poifons; but afterwards chiefly restrained to what, by way of distinction, has been called theeriaca Andromachi, or Venice treacle: but now altogether out of ufe.

This is a compound of no lefs than fifty-four drugs, prepared, pulverized, and reduced, by means of honey, into an electuary. The basis or foundation of the composition is viper's flesh. M. Charas has written a particular history of the animals, plants, and minerals, which enter the composition of this famed remedy.

It is said to be sovereign against the bites of venomous beasts, and in the wind-colic; and was also used in intermitting fevers, and in cases requiring periphrastics and diaphoretics: also in continual fevers, especially such as are malignant, and where the pulse is low and ticking: and in the small-pox and meafeus: and, as most of the ingredients of it are very hot, in all diseases where the natural heat is weak and languid.

Andromachus, Nero's physician, praises for the inventor of the theriaca; at leafl, it was he who gave the first description of it in elegiac verses; his fon did the fame in prose, and Damaecrates in labytes.

Anciently, the treacle made at Venice had all the ufe: and many still retain the ancient prejudice; but it has been since prepared at Montpellier, at Paris, and at London, with as much advantage as at Venice.

There is another vulgar kind of theriaca, called diaterrism, because it only consists of four ingredients.

Treacle-water and treacle-vinegar are found good preservatives against putrid air, whether by only being finct at, or by rubbing the winds, temples, and nofe with them.

THERIACA Rufficum, a name given to garlic, from its ufe as an antidote against the contagion of putrid and other putrid disorders.

THERIOMA, from Íeìgës, to rage, in Surgery, a ma- llignant ulcer.

THERMA, in Ancient Geography, a town of Cappadocia, on the route from Tavia to Cefarea, between Tavia and So- arus. Anton. Itin.—Als, a town situated on the confines of Macedonia, or rather of Thessaly, towards Thermopylae. This town was situated on the gulf called Thermaes, whence its name.

THERMA Pythis, baths of Asia Minor, in Bithynia. Pro- corpus mentions this place; and says that Juffianus constructed here a bath for public ufe, and a canal to conduct into it fresh water, and that he also provided others, which indicated a magnificence truly royal.

THERME, Íyám, in Architecture, ancient buildings, furnished with baths, especially of the hot kind.

Among the noblest of monuments of ancient Rome, are reckoned the therme, or baths of Diocletian. See Baths. Therme, or hot springs, it is commonly argued, owe their to a ccluciation, or effervescence, of the minerals in them. Though Dr. Woodward ascribes it to the subterraneous heat, or fire, which communicates with them by some spireacle, or canal, whereby a greater quantity of heat is derived thither, than to ordinary springs. See Bath.

THERMIÉ, Íyám, in Ancient Geography, a place on the southern coast of Sicily. Pliny denominates this place a Roman colony; and Antonine calls the sources of the hot water which gave the name of Thermæ to this place "Aqua Laroda." There were also baths at Selinunt in Sicily, called Thermæ Selinuntiz. The name thermæ was also given to those highly saline warm waters that were found in the neighbourhood of Corinth. THERMÆUS SINUS, a gulf of the Ígean sea, on the coast of Macedonia.

THERMASMA, a word used by some of the ancients, to
to express any thing that warms the body, and by others particularly for a warm fermentation, preferred by Hippocrates for removing pains in the side, and giving ease in pleurisy.

THERMES, in Ancient Geography, a town of Hispania Citerior, S. of Numantia.

THERMI, in Geography, a town of Atilic Turkey, in the province of Natolia; 24 miles N. of Burfa.

THERMIA, an island in the Grecian Archipelago, so called from its abounding with hot springs. It is not so mountainous as some of the other islands, and the soil, when well cultivated, produces very large quantities of barley, wine, and figs. The island also affords plenty of honey, wax, partridges, a great quantity of fine silk, and as much cotton as the inhabitants require for their own use. The Greek Christians in this island are computed at 16,000. Thermia is the see of a bishop, and contains fifteen or sixteen churches, and several convents. On the island are still visible the ruins of two cities; one of which, on the south coast, must have been of extraordinary splendour. N. lat. 37° 20'. E. long. 24° 32'.

THERMIA, a town and capital of the island of Thermia. N. lat. 37° 24'. E. long. 24° 26'.

THERMOMETER, Thermometric, derived from θερμα, heat, and μετρέω, to measure, an instrument shewing, or rather measuring, the increase and decrease of the heat and cold of the air.

The degree of heat, as ascertained by a thermometer, is only to be considered in relation to the surrounding bodies, by virtue of which a body supports the equilibrium of temperature, when it is in the neighbourhood of bodies equally heated: thus, if a thermometer stands at 60°, both in a vessel of water and in another of mercury, we may infer that the water and the mercury may be mixed without any change of their temperature; but the absolute quantity of heat contained in equal weights, or in equal bulbs, of any two bodies at the same temperature, is by no means the same. See Heat.

The general principles upon which the construction and use of thermometers, or measurers of heat depend, are stated and explained under the articles Caloric, Cold, Congelation, Freezing, Heat, &c.

It will be sufficient to observe in this place, that the well-known and most general effect of heat, whether it be obtained by compounding a certain substance into a narrower space, so that a quantity of heat may come out of it and be communicated to certain bodies, or by expanding a certain substance into a larger space, so that it may absorb a quantity of heat from surrounding bodies, and thus cool these bodies, or in whatever other way it be procured, is a dilatation of bodies, or an augmentation of their bulbs. The contrary effect is produced by cold, i.e. by a diminution of the free caloric. It must, however, be observed, that bodies of equal bulbs, but of different kinds, are not expanded alike by being heated to the same degree; nor are the increments of bulk in the same body always proportional to the quantities of heat which are communicated to it. E.g. if a given quantity of water, by being heated to a certain degree, be increased in bulk one cubic inch, the addition of double or treble that quantity of heat will not increase its bulk two or three cubic inches respectively; therefore the expansions of water are not proportional to the increments of heat.

The only practicable method of measuring the expansions of fluids, is by involving them in certain vessels, and by measuring that part of the cavity of each vessel which is occupied by the particular fluid which fills it in different temperatures.

It is evident, that the substance of the vessel is also expanded by the heat, and of course its cavity is enlarged. Therefore, when we find that the bulk of the fluid is increased, that apparent increment is only the difference between the enlarged capacity of the vessel and the increased bulk of the fluid. For this reason those vessels must be made of such substances as are least expansible by heat. Indeed glasses is the substance which is universally used for such purposes, both on account of its little expansibility, and of its transparency, besides its having other remarkably useful properties.

A glass vessel filled to a certain degree with a liquid, for the purpose of shewing the expansion of that liquid in different temperatures, or for the purpose of shewing the temperature by the corresponding expansion of that liquid, is called a thermometer.

The thermometer and thermoscope are ordinarily accounted the same thing: Wolfius, however, makes a difference; but shews, at the same time, that what we call thermometers are, in reality, no more than thermostopes.

The invention of the thermometer is attributed to several persons by different authors, viz. to Sanctorio, Galileo, Father Paul, and Drebbel. The invention is ascribed to Cornelius Drebbelius of Almeaer, about the beginning of the seventeenth century, by his countrymen Boerhaave (Chem. i. p. 152. 156.) and Mufchenbroeck, Introduct. ad Philat. Nat. vol. ii. p. 625.

Fulgenzio, in his life of Father Paul, gives him the honour of the first discovery. Vincenzio Viviani (Vit. de l'Galil. p. 67. See too Oper. di Galil. pref. p. 47.) speaks of Galileo as the inventor of thermometers. But Sanctorio himself (Com. in Galen. Art. Med. p. 736 — 842. Com. in Avicen. Can. Fen. i. p. 22. 78. 219.) expressly affirms this invention; and Borelli (De Mot. Animal. ii. prop. 175.) and Malpighi (Oper. Polth. p. 30.) ascribe it to him without referre. Upon which Dr. Martine remarks, that these Florentine academicians are not to be suspected of partiality in favour of one of the Patavinesian school. But whoever was the first inventor of this instrument, it was very rude and imperfect; and as the various degrees of heat were indicated by the different contraction or expansion of air, it was afterwards found to be an uncertain and sometimes a deceiving measure of heat, because the bulk of air was affected, not only by the difference of heat, but likewise by the variable weight of the atmosphere.

There are various kinds of thermometers; the contraction, defects, theory, &c. of which, are as follow:

Construction of the Thermometer, depending on the Rarefaction of the Air.—This aerial thermometer, which was that first invented by Drebbel, consists of a glass tube B E (Plate XVI. Pneumaticks, fig. 1.), connected at one end with a large glass ball A, and at the other end immerged in an open vessel, or terminating in a ball D E, with a narrow orifice at D; which vessel, or ball, contains any coloured liquor that will not easily freeze. Aqua fortis tinged of a fine blue colour with solutio of vitriol or copper, or spirit of wine tinged with cochineal, or Brazil wood, will answer this purpose. But the ball A, must be first moderately warmed, so that a part of the air contained in it may be expelled through the orifice D; and then the liquor pressed by the weight of the atmosphere will enter the ball D E, and rise, e. g. to the middle of the tube at C, at a mean temperature of the weather; and in this state the liquor by its weight, and the air included in the ball A, &c. by its elascitt, will counter-balance the weight of the atmosphere. As the surrounding air becomes warmer, the air in the ball and upper part of the tube, expanding by heat, will drive the liquor into the lower
lower ball, and consequently its surface will descend; on
the contrary, as the ambient air becomes colder, that in the
ball is condensed, and the liquor pressed by the weight of
the atmosphere will ascend; so that the liquor in the tube
will ascend or descend more or less, according to the rate
of the air contiguous to the instrument. To the tube is
attached a vane of the same length, divided upwards and
downwards from the middle, C, into one hundred equal parts,
by means of which the ascendent and descendent of the liquor
in the tube, and consequently the variations in the cold or heat
of the atmosphere, may be observed.

It must be acknowledged, that the expansion of elastic
fluids affords, in some cases, a test of heat, which is very
convenient from its great delicacy, and because a very small
quantity of heat is sufficient to raise their temperature very
considerably.

A similar thermometer may be constructed by putting a
small quantity of mercury, not exceeding the bulk of a pea,
into the tube B C (fig. 2.) then bent in wretches, that taking
up the less height, it may be the more manageable and less
liable to harm; divide this tube into any number of equal parts
to serve for a scale.

Here appear the approaches of the mercury towards the ball, A,
will show the inerat of the degree of heat. The reason is
the same as in the former.

The defect of both these instruments consists in this,
that they are liable to be acted on by a double cause: for, not
only a decrease of heat, but also an increase of weight of the
atmosphere, will make the liquor rise in the one, and the
mercury in the other; and, on the contrary, either an in-
crease of heat, or decrease of weight of the atmosphere, will
make it descend.

In winter, for example, the liquor would rise and sink too
much; for a frost condensing the internal air, the liquor
would ascend, but as the air is heavier in frosty weather, its
pressur on the liquor in the vessel D E (fig. 1.) being in-
creased, would raise the liquor still higher in the tube, and
thus indicate a degree of cold greater than it really is. On
the other hand, if the weather grows warm, as it does in
rainy weather in winter, the air in the ball will expand, and
the liquor descend in the tube; but as the weight of the at-
mosphere is less in foul weather, the liquor in D E, will be less
pressed than it was, and suffer the liquor to descend more than
it should do, and show a greater degree of warmth than that
of the ambient air. The reverse of this will happen in sum-
mmer: for warm weather being fair weather, and the atmo-
sphere being then heavier than usual, the liquor will be made
to stand higher in the tube than it should do, and shew the
degree of heat to be less than it really is. And as in
summer, the weather becomes cold with rain; but the
weight of the atmosphere being diminished, the liquor will
not ascend so far as it ought to ascend by the condensation
of the internal air, and therefore indicate the cold to be less
than it really is: and when the two causes, thus contributing
to the rise and fall of the liquor, act equally in opposite di-
rections, the liquor would appear neither to ascend nor de-
scent, whatever might be the changes in the temperature of
the atmosphere, on account of equal corresponding varia-
tions in its gravity. Besides, the air in the ball, &c. is liable
to be affected more or less in its elastic quality by the vapours
that detach themselves from the included liquor according to
the degree in which it is heated or cooled. For these and
other purposes, thermometers of this kind have been long
diffused.

Instruments of this kind, when they are subject to the
variations of the pressure of the atmosphere, as well as to
those of its temperature, are properly called manometers,
and require, for enabling us to employ them as thermo-
meters, a comparison with the barometer; while, on the other
hand, they may be used as barometers if the temperature be
otherwise ascertained. They are, however, very useful
without this comparison, in delicate experiments of short
duration; besides, the changes of the barometer are seldom
very rapid, and they may also be wholly freed from the
effects of the pressure of the atmosphere in various ways.

Bernoulli's method consists in closing the tube of a com-
mon barometer so as to leave the column of mercury in equi-
lbrum with the air contained in the bulb at its actual tem-
perature, and capable of indicating, by the changes of its
height and of its pressure, any subsequent changes in the
temperature of the air, which must affect both its bulk and
its elasticity. (See fig. 3.) Mr. Lefle's photometer, or
Differential Thermometer (which he), has some advantages
which render it better than this instrument; but it can only
be employed when the changes of the temperature can be
confined only to a part of the instrument. The elasticity of
the air contained in the bulb is here counteracted, not by the
pressure of a column of mercury, but by the elasticity of
another portion of air in a second bulb, which is not to be
exposed to the heat or cold that is to be examined; and the
difference of the temperatures of the two bulbs is indicated
by the place of a drop of a liquid, moving freely in the
tube which joins them.

M. Amontons, in 1703, with a view of perfecting the
aerial thermometer, contrived his universal thermometer.
Finding that the changes produced by heat and cold in the
bulk of the air were subject to invincible irregularities, he
substituted for these the variations produced by heat in the
elastic force of this fluid. This thermometer consisted of a
long tube of glass (see fig. 4.) open at one end, and recurved
at the other end, which terminated in a ball. A certain
quantity of air was compressed into this ball by the weight
of a column of mercury, and also by the weight of the at-
mosphere. The effect of heat on this included air was to
make it sustain a greater or less weight; and this effect
was measured by the variation of the column of mercury in
the tube, corrected by that of the barometer, with respect
to the changes of the weight of the external air. This instru-
ment, though much more perfect than those in the room of
which it was substituted by its inventor, is nevertheless sub-
ject to very considerable defects and inconveniences. Its
length of four feet renders it unfit for a variety of experi-
ments, and its construction is difficult and complex; it is
extremely inconvenient for carriage, as a very small inclina-
tion of the tube would suffer the included air to escape;
and the friction of the mercury in the tube, and the compre-
sibility of the air, contribute to render the indications of
this instrument extremely uncertain. Besides, the dilatation
of the air is not so regularly proportional to its heat, nor is its
dilatation by a given heat nearly so uniform as it supposed.
This depends, as the abbé Nollet has suggested, much on its
moisture; for dry air does not expand near so much by a
given heat, as air stored with watery particles; which by
being converted into steam, very much increase the feeing
volume of the air. For these and other reasons enumerated
by M. de Luc, (Rêcherches fur les Mod. de l'Atm. tom. i.
p. 278, &c.) this instrument was imitated by very few, and
never came to be of general use.

Construction of the Florentine Thermometer.—The acade-
miasts del Cimento, about the middle of the seventeenth cen-
tury, considering the inconveniences of the air-thermo-
meters above described, attempted another, that should mea-
ure heat and cold by the rarefaction and condensation of
spirit of wine; though much less than those of air, and con-
sequently
to express anything that warms the body, and by others particularly for a warm fermentation, preferred by Hippocrates for removing pains in the side, and giving ease in plentifuls.

THERMES, in Ancient Geography, a town of Hispania Citerior, S. of Numantia.

THERMI, in Geography, a town of Asiatic Turkey, in the province of Natalia; 24 miles N. of Burfa.

THERMIA, an island in the Grecian Archipelago, so called from its abounding with hot springs. It is not so mountainous as some of the other islands, and the soil, when well cultivated, produces very large quantities of barley, wine, and figs. The island also affords plenty of honey, wax, partridges, a great quantity of fine silk, and as much cotton as the inhabitants require for their own use. The Greek Christians in this island are computed at 16,000. Thermia is the see of a bishop, and contains fifteen or sixteen churches, and several convents. On the island are still visible the ruins of two cities; one of which, on the south coast, must have been of extraordinary splendour. N. lat. 37° 20', E. long. 24° 32'.

THERMA, a town and capital of the island of Thermia. N. lat. 37° 24'. E. long. 24° 26'.

THERMOMETER, Thermometrum, derived from
hebes, heat, and μετρειν, to measure, an instrument shewing, or rather measuring, the increase and decrease of the heat and cold of the air.

The degree of heat, as ascertained by a thermometer, is only to be considered in relation to the surrounding bodies, by virtue of which a body supports the equilibrium of temperature, when it is in the neighbourhood of bodies equally heated: thus, if a thermometer stands at 60°, both in a vessel of water and in another of mercury, we may infer that the water and the mercury may be mixed without any change of their temperature: but the absolute quantity of heat contained in equal weights, or in equal bulks, of any two bodies at the same temperature, is by no means the same. See HEAT.

The general principles upon which the construction and use of thermometers, or measurers of heat depend, are stated and explained under the articles CALORIC, COLD, CONGELATION, FREEZING, HEAT, &c.

It will be sufficient to observe in this place, that the well-known and most general effect of heat, whether it be obtained by compressing a certain substance into a narrower space, so that a quantity of heat may come out of it and be communicated to certain bodies, or by expanding a certain substance into a larger space, so that it may absorb a quantity of heat from surrounding bodies, and thus cool these bodies, or in whatever other way it be procured, is a dilatation of bodies, or an augmentation of their bulks. The contrary effect is produced by cold, i.e. by a diminution of the free caloric. It must, however, be observed, that bodies of equal bulks, but of different kinds, are not expanded alike by being heated to the same degree; nor are the increments of bulk in the same body always proportional to the quantities of heat which are communicated to it. E.g. if a given quantity of water, by being heated to a certain degree, be increased in bulk one cubic inch, the addition of double or treble that quantity of heat will not increase its bulk two or three cubic inches respectively; therefore the expansions of water are not proportional to the increments of heat.

The only practicable method of measuring the expansions of fluids, is by inclining them in certain vessels, and by measuring that part of the cavity of each vessel which is occupied by the particular fluid which fills it in different temperatures.

It is evident, that the substance of the vessel is also expanded by the heat, and of course its cavity is enlarged. Therefore, when we find that the bulk of the fluid is increased, that apparent increment is only the difference between the enlarged capacity of the vessel and the increased bulk of the fluid. For this reason those vessels must be made of such substances as are least expansible by heat. Indeed glafs is the substance which is universally used for such purposes, both on account of its little expansibility, and of its transparency, besides its having other remarkably useful properties.

A glass vessel filled to a certain degree with a liquid, for the purpose of shewing the expansion of that liquid in different temperatures, or for the purpose of shewing the temperature by the corresponding expansion of that liquid, is called a thermometer.

The thermometer and thescope are ordinarily accounted the same thing; Wolhus, however, makes a difference; but shews, at the same time, that what we call thermometers are, in reality, no more than thescope.

The invention of the thermometer is attributed to several persons by different authors, viz. to Sanctorius, Galileo, Father Paul, and Drebble. The invention is ascribed to Cornelius Drebbelius of Almeaer, about the beginning of the fourteenth century, by his countryman Boerhaave (Chem. i. p. 152. 156.) and Mufchenbrock, Intro. ad Phil. Nat. vol. ii. p. 625.

Fulgenzio, in his life of Father Paul, gives him the honour of the first discovery. Vincenzo Viviani (Vit. de' Galil. p. 67. See too Oper. di Galil. pref. p. 47.) speaks of Galileo as the inventor of thermometers. But Sanctorius himself (Com. in Galen. Art. Med. p. 736—842. Com. in Avicen. Can. Fen. i. p. 22. 78. 219.) expressly assumes this invention; and Borelli (De Mot. Animal. ii. prop. 175.) and Malpighi (Oper. Polth. p. 30.) ascribe it to him without reserve. Upon which Dr. Martine remarks, that these Florentine academicians are not to be suspected of partiality in favour of one of the Patavini school. But whoever was the first inventor of this instrument, it was very rude and imperfect; and as the various degrees of heat were indicated by the different contraction or expansion of air, it was afterwards found to be an uncertain and sometimes a deceiving measure of heat, because the bulk of air was affected, not only by the difference of heat, but likewise by the variable weight of the atmosphere.

There are various kinds of thermometers; the construction, defects, theory, &c. of which, are as follow:

Construction of the Thermometer, depending on the Rarefaction of the Air.—This aerial thermometer, which was that first invented by Drebble, consists of a glass tube B E (Plate XVI. Pneumatics, fig. 1.), connected at one end with a large glass ball A, and at the other end immered in an open vessel, or terminating in a ball D E, with a narrow orifice at D; which vessel, or ball, contains any coloured liquor that will not easily freeze. Aqua fortis tinged of a fine blue colour with solution of vitriol or copper, or spirit of wine tinged with cochineal, or Brazil wood, will answer this purpose. But the ball, A, must be first moderately warmed, so that a part of the air contained in it may be expelled through the orifice D; and then the liquor pressed by the weight of the atmosphere will enter the ball D E, and rise, e.g. to the middle of the tube at C, at a mean temperature of the weather; and in this state the liquor by its weight, and air included in the ball A, &c. by its elasticity, will counterbalance the weight of the atmosphere. As the surrounding air becomes warmer, the air in the ball and upper part of the tube, expanding by heat, will drive the liquor into the lower
lower ball, and consequently its surface will descend; on
the contrary, as the ambient air becomes colder, that in
the ball is condensed, and the liquor preffed by the weight
of the atmosphere will ascend: so that the liquor in the tube
will ascend or descend more or lefs, according to the rate
of the air contiguous to the instrument. To the tube is
affixed a scale of the fame length, divided upwards and
downwards from the middle, C, into one hundred equal parts,
by means of which the acent and defcent of the liquor in
the tube, and consequently the variations in the cold or heat
of the atmosphere, may be obferved.

It must be acknowledged, that the expansion of efiastic
fluids affords, in fome cafes, a teft of heat, which is very
convenient from its great delicacy, and because a very small
quantity of heat is fufficient to raise their temperature very
considerably.

A similar thermometer may be constructed by putting a
small quantity of mercurv, not exceffing the bulk of a pea,
into the tube B C (fig. 2.) Thus bent in wretches, that taking
up the lefs height, it may be the more managable and lefs
liable to harm; divide this tube into any number of equal parts
to serve for a fcale.

Here the approaches of the mercury towards the ball, A,
will fhew the increase of the degree of heat. The reafon is
the fame as in the former.

The defect of both these instruments consists in this,
that they are liable to be acted on by a double caufe; for, not
only a defcent of heat, but alfo an increafe of weight of the
atmosphere, will make the liquor rife in the one, and the
mercury in the other; and, on the contrary, either an in-
crease of heat, or defcence of weight of the atmosphere, will
make it defend.

In winter, for example, the liquor would rife and sink too
much; for a frot condensing the internal air, the liquor
would ascend, but as the air is heavier in frotty weather, its
preffure on the liquor in the vefsel D E (fig. 1.) being in-
creased, would rife the liquor still higher in the tube, and
thus indicate a degree of cold greater than it really is. On
the other hand, if the weather grows warm, as it does in
rainy weather in winter, the air in the ball will expand, and
the liquor defcend in the tube; but as the weight of the at-
mosphere is lefs in foil weather, the liquor in D E will be lefs
preffed than it was, and fuffer the liquor to defcend more than
it fhould do, and fhew a greater degree of warmth than that
of the ambient air. The reverse of this will happen in fum-
mer: for warm weather being fair weather, and the atmo-
sphere being then heavier than usual, the liquor will be made
to stand higher in the tube than it fhould do, and fhew
the degree of heat to be lefs than it really is. And as in
summer, the weather becomes cold with rain; but the
weight of the atmosphere being diminished, the liquor
will not defcend fo far as it ought to defcend by the condenfation
of the internal air, and therefore indicate the cold to be lefs
than it really is: and when the two cafes, thus contributing
to the rife and fall of the liquor, act equally in opposite di-
rctions, the liquor would appear neither to defcend nor
defcend, whatever might be the changes in the temperature
of the atmosphere, on account of equal correponding varia-
tions in its gravity. Besides, the air in the ball, &c. is liable
to be affected more or lefs in its efiastic quality by the vapours
that detach themselves from the included liquor according to
the degree in which it is heated or cooled. For thefe and
other reasons, thermometers of this kind have been long
diffufed.

Instruments of this kind, when they are fubject to the
variations of the preffure of the atmosphere, as well as to
thofe of its temperature, are properly called manometers,
and require, tor enabling us to employ them as thermo-
meters, a comparifon with the barometer; while, on the other
hand, they may be used as barometers if the temperature be
otherwise ascertained. They are, however, very useful
without this comparison, in delicate experiments of fhort
duration; besides, the changes of the barometer are feldom
very rapid, and they may also be wholly freed from the
effects of the preffure of the atmosphere in various ways.

Bernouilli’s method confifts in closing the tube of a com-
mum barometer fo as to leave the column of mercury in equi-
librium with the air contained in the bulb at its actual tem-
perature, and capable of indicating, by the changes of its
height and of its preffure, any subsequent changes in the
temperature of the air, which mufi affect both its bulk and
its efiaticity. (See fig. 3.) Mr. Leflie’s photometer, or
Differential Thermometer (which fee), has fome advantages
which render it better than this instrument; but it can only
be employed when the changes of the temperature can be
confined only to a part of the instrument. The efiaticity of
the air contained in the bulb is here counteracted, not by the
preffure of a column of mercury, but by the efiaticity of
another portion of air in a fecond bulb, which is not to be
exposed to the heat or cold that is to be examined; and the
difference of the temperatures of the two bulbs is indicated
by the place of a drop of a liquid, moving freely in the
tube which joins them.

M. Amontons, in 1702, with a view of perfefiting the
aerial thermometer, contrived his univerfal thermometer.
Finding that the changes produced by heat and cold in the
bulk of the air were fubject to invincible irregularities, he
fubliftuted for thefe the variations produced by heat in the
efiastic force of this fluid. This thermometer confifted of a
long tube of glafs (see fig. 4.) open at one end, and recurved
at the other end, which terminated in a ball. A certain
quantity of air was comprefTed into this ball by the weight
of a column of mercurv, and also by the weight of the at-
mosphere. The effect of heat on this included air was to
make it retain a greater or lefs weight; and this effect was
measured by the variation of the column of mercury in the
tube, corrected by that of the barometer, with refeft to
the changes of the weight of the external air. This instru-
ment, though much more perfect than thefe in the room of
which it was fubfifted by its inventor, is nefertheless fub-
ject to very considerable defects and inconveniences. Its
length of four feet renders it unfit for a variety of expe-
mements, and its construftion is difficult and complex; it is
extremely inconvenient for carriage, as a very small inclina-
tion of the tube would fuffer the included air to efcape: and
the friction of the mercury in the tube, and the comprefti-
bility of the air, contribute to render the indications of this
inftument extremely uncertain. Besides, the dilatation of
the air is not fo regularly proportional to its heat, nor is its
dilatation by a given heat nearly fo uniform as he fuppoTed.
This depends, as the abbe Nollet has fuggedted, much on its
moifure; for dry air does not expand near fo much by a
given heat, as air flored with watery particles; which by
being converted into steam, very much inereafe the foming
volume of the air. For thefe and other reafons enumerated
by M. de Luc, (Rercherches fur les Mod. de l’Atm. tom. i.
p. 278, &c.) this instrument was imitated by very few, and
never came to be of general ufe.

Conftitution of the Florentine Thermometer.—The acade-
mifts del Cimento, about the middle of thefeventeenth cen-
tury, confidering the inconveniences of the air-thermo-
meters above defcribed, attempted another, that should mea-
sure heat and cold by the rarefaction and condensation
of spirit of wine; though much lefs than those of air, and con-
sequently
frequently the alterations in the degree of heat likely to be much less sensible.

The spirit of wine was enclosed in glass tubes, hermetically sealed; so that these thermometers could be subject to no inconvenience by the evaporation of the liquor, or the variable gravity of the incumbrant atmosphere. Instruments of this kind were first introduced into England by Mr. Boyle, and they were soon universally used among philosophers in other countries. The Florentine thermometer consists of a small narrow tube B C D (fig. 5) connected with a glass ball A. The tube should be procured as cylindrical as possible; and it may be tried, by putting into one end of it as much mercury as will fill the length of one inch, and letting this quantity of mercury pass from one part of the tube to another, through its whole length; measure with compasses the length it occupies in every part of the tube; and if it everywhere takes up an inch, the tube is cylindrical, and the scale of equal divisions will agree with it: otherwise it will be longer where the tube is smaller, and shorter than an inch where the tube is larger; and in this case, the divisions must be suited to the contents of the bole. The glass ball may then be joined to the tube, and a small cavity be made at the other end. Fill the ball and tube with rectified spirit of wine to a convenient height, as to C, when the weather is of a mean temperature, which may be done by inverting the tube into a vessel of marked coloured spirit, under a receiver of the air-pump, or by many other ways. The spirit may be coloured by pouring a quantity of it on small pieces of turmeric, which will hereby receive a red tincture; and the spirit may be repeatedly filtrated through brown paper, in order to separate from it the coarser particles of the root. Some persons, in filling the ball and tube, for preventing the spirit from wholly descending into the ball in winter, recommend putting the ball into a lump of snow, mixed with salt; or if the instrument be made in summer, into spring-water impregnated with salt-petre, that the condensed spirit may flow slow. It will retire in extreme cold. If it rises to too great a height from the ball, part of it is to be taken out; and that the tube may not be made longer than necessary, it is convenient to immerge the ball, filled with its spirit in boiling water, and to mark the farthest point to which it then rises. When the thermometer is properly filled, with a lamp heat the little bubble left at the end of D red-hot, and seal it hermetically, leaving, as Dr. Defaguliers recommends, in the thermometer only the third part of the air that was in it, which will give room to the dilatation of the spirit; and this rarefied air will prevent the air left in the spirit, even after the air-pump has been applied, from dividing the spirit by its expansion. To the tube apply a scale, divided into one hundred equal parts, from C towards D, and also from C towards B.

Now, spirit of wine rarefying and condensing very considerably; as the heat of the ambient air increases, the spirit will dilate, and consequently will ascend in the tube; and as the heat decreases, the spirit will descend; and the degree or quantity of ascent and descent will be seen in the scale. Yet as the ratio of yesterday's heat to to-day's is not hereby discovered, this instrument is not strictly a thermometer, any more than the former.

It is to be here observed, 1. That as the natural gravity of the liquor makes it tend downwards, so it refits its ascent out of the ball into the tube; and that the more, as it rises higher; for which reason, some have advised to have the tube horizontal.

2. Since there must of necessity be some air left in the void part of the tube, over the liquor, that air, by its elasticity, will tend downwards, and of consequence will refit the rise of the liquor, and be compressed by it as it does rise: its elasticity therefore is thus increased.

3. Since it is found from experience, that a lees degree of heat is communicated more easily to the spirit of wine in the ball than a greater, the rarefactions of the spirit of wine are not proportionable to their producing caufes; especially since a greater degree of heat finds more liquor in the tube than a less does, to which, notwithstanding, the heat may be more easily communicated than to that stagnating in the ball.

4. Spirit of wine is incapable of bearing very great heat or very great cold. It boils sooner than any other liquor, and, therefore, the degrees of heat of boiling fluids cannot be determined by this thermometer. And though it retains its fluidity in pretty severe cold, yet it seems not to condence very regularly in them; and at Torneo, near the polar circle, the winter cold was so severe, as Maupertius informs us, that the spirits were frozen in all their thermometers. So that the latitude of heat and cold, which spirit of wine is capable of indicating, is much too limited to be of very great or universal use. On these accounts, the Florentine thermometer, though it has been much ufed, is far from being an accurate measure of heat, &c. to which may be added what Dr. Halley observes in the Philosophical Transactions, that he has learned from those who have kept spirit of wine long, that it always loses part of its expansive force in course of time.

This objection, fuggled by Dr. Halley, and often infilled on by others, has, according to Dr. Martine, no great weight. Well rectified spirit of wine, if sealed up in a glafs, is in a considerable degree unalterable. It cannot evaporate; and by many years experience its force of expansion has continued the same; as, beside other observations, we know especially from the Annual Register of M. de la Hire's spirit thermometer, that have been kept in the Observatory for many years.

Another great defect of these, and other thermometers, is, that their degrees are not comparable with each other. They mark, indeed, the different degrees of heat and cold; but each marks only for itself, and after its own manner; because they do not proceed from any point of heat, or cold, that is common to them all. It is with them as with two clocks, which for want of having been first set to the same hour by the sun, will, indeed, mark that one, two, or more hours are passed, but not what hour it is by the day. Nor can we be assured, that when the liquid is rifen a degree in two different thermometers, they have both suffered the same impression of an equal additional heat: since the spirit of wine may not be the same in both; and, in proportion as the spirit is more or less rectified, it will rise more or less high by the same heat. Nor is this all; for in graduating thermometers, they often take equal lengths of the tube for equal facets of the spirit: whereas, supposing the diameters of the tube equal throughout, which very rarely happens, there are so many irregularities withinide, that a certain length of tube sometimes requires double the quantity of liquor to fill it, that the fame length in another tube of the same diameter requires. All which arises from the unequal thicknesses of the parietes of tubes in different places; and from accidental prominences and cavities, always found in the inner surfaces of tubes; and especially from their being always bigger at one end than the other.

Besides, the divisions of the scale cannot accurately indicate the quantity of rarefaction, unless the proportion of the cavity of the tube D B to that of the ball A were known. Hence it is, that the comparifon of thermometers becomes so precarious and defective. Yet the most curious and interesting use of thermometers is, what ought to arise from such
such comparison. It is by this we should know the heat or
cold of another season, of another year, another climate,
&c. and what is the greatest degree of heat or cold in
which men and other animals can subsist.

M. de Réaumur contrived a new thermometer for the pur-
pose; wherein the inconveniences above recited are pro-
poed to be remedied. He took a large ball and tube,
and knowing the content of the ball as well as that of the
tube in every part, he graduated the tube, so that the space
from one division to another might contain a thousandth
part of the liquor, which liquor would contain one thousand
parts when it froze at the freezing point: then putting
the ball of his thermometer, and part of the tube, into boiling
water, he observed whether it rose eighty divisions; and if
it exceeded those, he changed his liquor, and by adding
water lowered it, so that on the next trial from the freezing
point to the point of boiling water, it should only rise
eighty divisions: but if the liquor, being too low, fell short
of eighty divisions, he raised it by adding rectified spirit to
it. The liquor thus prepared suited his purpose, and served
for making a thermometer of any size, whose scale would
agree with his standard. Such liquor, or spirits, being
about the strength of common brandy, may easily be had
any where, or made of a proper degree of density by raising
or lowering it.

The abbé Nollet made many excellent thermometers upon
M. de Réaumur's principle. Dr. Martine, however, ex-
presses his apprehensions that thermometers of this kind are
constructed on principles, that will by no means be found so
accurate as were to be wished and expected. The balls,
or bulbs, being large, as three or four inches in diameter,
are neither heated nor cooled soon enough to shew the
variations in the heat of bodies, and in the weather. Small
bulbs and small tubes, be they, are much more convenient,
and may be constructed with sufficient accuracy. Though
it must be allowed, that Réaumur, by his excellent scale,
and by depriving the spirit of wine of its air, and expelling
the air by means of heat from the ball and tube of his
thermometer, has brought it to as great a degree of perfor-
cation as it may possibly admit; yet it is liable to some of the
inconveniences of spirit thermometers, and much inferior to the
mercurial thermometers. Thermometers of this kind,
and those of mercury, do not agree in indicating the same
degrees of extreme cold; for when the mercury has frozen
at 25° below 0, the spirit indicated only 18°; and when
the mercury froze at 26° or 27° below 0, the spirit rested at 25°
or 26°. See the description of Réaumur's thermometer at
In 1740, M. Michieli di Creth contrived a spirit ther-
meter, to which he annexes four scales besides its own, viz.
that of the old thermometer in the Observatory at Paris,
Réaumur's, de l'Inde's, and Fahrenheit's. See Fixed Points
of Thermometers.

Thermometer, Mercurial. It is a circumstance of prin-
cipal importance in the construction of thermometers, to
procure a fluid that measures equal variations of heat by
corresponding equal variations in its own bulk or volume:
and the fluid which possesses this essential requisite in the
most perfect degree is mercury: the variations in its bulk
approaching nearer to a proportion with the correspond-
ing variations of its heat than any other fluid. This general
proposition M. de Luc has very elaborately evinced, by
shewing that the condensations of fluids, which increase in
bulk when they freeze, are not proportional to the dimin-
utions of heat; and that the dilatations of fluids, which are
easily converted into vapour by heat, are not proportional
to the augmentations of heat: whereas the bulk of mercury
is not enlarged when it freezes, and it refills evaporation
more than every other liquid that has been used in the con-
struction of thermometers. Besides, it is of all liquids the
most easily purged of its air. It is also the most proper for
measuring very considerable variations of heat; for, if a scale
be graduated with 0 at the point of melting ice, and 80 at
that of boiling water, mercury well purged of its air will
indicate seven times this difference of heat, or 561 degrees
in such a scale; as it will condense without freezing to 261
of this scale, and expand without boiling to 300 of the
same scale. Mercury is also more flexible than any other
fluid, air excepted, and conforms more readily to the several
variations of heat. Moreover, as mercury is an homogeneous
fluid, it will in every thermometer exhibit the same dilata-
tion or condensation by the same variations of heat. The
expansion of mercury is scarcely less regular than that of
solids, which probably approaches the nearest to the steps
of the natural scale, though not without some inequality;
and therefore a portion of mercury included in a bulb of gla-
ss, having a fine tube connected with it, forms a thermometer
the most convenient and probably the most accurate of any,
for common use; the degrees corresponding very nearly
with those of the natural scale, although, according to the
most accurate experiments, they appear to indicate, towards
the middle of the common scale of Fahrenheit, a temperature
two or three degrees too low. There is an inequality of
the same kind, but still greater, in the degrees of the spirit
thermometer; and this instrument has also the disadvantage
of being liable to burst in a heat below that of boiling water;
nevertheless, it is well calculated for the measurement of
very low temperatures, since pure alcohol has never yet been
frozen, while mercury has been reduced to a solid by the
cold of Siberia and of Hudson's Bay; but both mercury
and linseed oil support a heat of between 500° and 600°,
without ebullition.

In order to render thermometers uniform and comparable,
it is desirable that mercury, so excellently adapted for this
purpose, should be the only fluid used in the construction of
them, more especially as a thermometer with mercury may
be more easily constructed than any others. De Luc's
Récherches, &c. vol. i. part ii. cap. 2. passim.

Dr. Halley, though approved only of some of the remark-
able properties of mercury above recited, seems to have
been the first who suggested the application of this fluid
to the construction of thermometers. Phil. Trans. Abr.
vol. ii. p. 34.

Boerhaave (Chem. i. p. 720.) says, these mercurial ther-

mometers were first contrived by Olaus Roemer; but the
claims of Fahrenheit of Amsterdam, who gave an account
of his invention to the Royal Society in 1724 (Phil. Trans.
N° 381, or Abr. vol. vii. p. 49.) have been generally
allowed. And though Prins and others, in England,
Holland, France, and other countries, have made this in-
strument as well as Fahrenheit, most of the mercurial ther-

mometers are graduated according to his scale, and are called
Fahrenheit's thermometers. There are made of different
lengths, and with some variation in the form of the bulb,
according to the purposes for which they are designed.
Instead of the ball, used in the spirit thermometer, a cone
or cylinder is annexed to the tube, which may be easily enlarged
or diminished, and made of such a magnitude, that its
capacity may have a certain and known proportion to that
of the tube; and by this means several thermometers may
be constructed to the same scale: besides, the heat more
easily
THERMOMETER.

easily penetrates and reaches the innom parts of the cylindrical bulb, and causes the whole content to expand uniformly, and the mercury to rise almost immediately; whereas in thermometers with a spherical bulb it is seen first to fall, and then to rise. This phenomenon has been long since noticed both in Florentine and mercurial thermometers, when they are suddenly plunged into a heated liquid, the spirit of wine or mercury first descends, and then ascends; and when they are plunged into a cold fluid, the included liquid first ascends and then descends: this is the more remarkable in thermometers whose bulb is made of thick glass; and the reason of the phenomenon is obvious. The bulb of glass is sooner affected by the heat or cold applied to it than the included fluid; and as the glass expands by heat, the capacity of the bulb is enlarged, and the liquid descends in the tube, but being condensed by cold, and its capacity diminished, the liquid is pressed upwards in the tube: and both these effects continue till the heat and cold equally affect the included fluid. Hence it follows, that all the variations of acet and deficient, to which the spirit or mercury is subject in the thermometer, are only the differences of the rarefacts and condensations of glass, and of the contained fluid. Hilt. Ac. Royal, 1705.

The cone, or cylinder, of the thermometer is made of glass of a moderate thickness, left, when the exhausted tube is hermetically sealed, its internal capacity should be diminished by the weight of the ambient atmosphere. When the mercury is thoroughly purged of its air and moisture by boiling, the thermometer is filled with a sufficient quantity of it; and before the tube is hermetically sealed, the air is wholly expelled by heating the mercury, so that it may be rarefied and ascended to the top of the tube. To the side of the tube is annexed a scale (see fig. 4.) which Fahrenheit divided into six hundred parts, beginning with that of the sever cold which he had observed in Iceland in 1709, or that produced by surrounding the bulb of the thermometer with a mixture of snow or beaten ice and salt-ammoniac or sea-salt. He apprehended to be the greatest degree of cold, and accordingly he marked this, as the beginning of his scale, with °; the point at which mercury begins to boil, he conceived to have the greatest degree of heat, and this he made the limit of his scale. The distance between these two points, he divided into six hundred equal parts or degrees; of which 32 reckoned from °, indicates the degree of cold when snow or ice thaws naturally, or when water begins to freeze, and this is called the freezing point: and he marked the heat of boiling water with 212, &c. In order more particularly to explain the divisions of this scale, and to show how the dilatation and condensation of the mercury are estimated by it, we may observe that the bulb is supposed to contain, according to Boerhaave and Mulchenbroek, 11124 parts of quicksilver, which stands at the lowest mark, or gr. °, in an intense cold, &c. as above determined: if the bulb be immersed in snow or ice thawing naturally, or in water beginning to freeze, the quicksilver is diluted, and rises in the tube 32 of these 11124 parts; and therefore the space of the tube from gr. ° to the freezing point gr. 32, is divided into thirty-two equal parts. When the thermometer is placed in water brought to a strong boiling at a middle state of the atmosphere in places near the level of the sea, when the mercury in the barometer stands at about 30 inches or a very little under it, the quicksilver is diluted 212 of these parts beyond its original bulk of 11124, fo as now to poife the bulb and tube together a space equal to 11356 such parts; and the space from gr. 32 to gr. 212, is divided into 180 equal parts or degrees of the thermometer; which, if the tube be long enough, may be protracted as far as is convenient. It may extend well enough to gr. 600, and not much farther, for with a heat but little greater than that the mercury begins to boil.

Dr. Boerhaave, in one place, makes the number of parts into which the mercury in the bulb is supposed to be divided to be 10782 instead of 11124, and in another place states it at 11520, which Dr. Martine apprehends to be nearer the truth, or about 17990 parts, and he thinks the cáius and uret method is to fill the bulb and tube, without being solicitous about the bulk of the quicksilver, so that in freezing water, or melting ice, the mercury shall stand at a convenient height, which must be very nicely marked gr. 32; and then as accurately to observe where it stands when distilled by the heat of boiling water to gr. 212. The intermediate space is then divided into 180 degrees, which scale may be protracted upwards or downwards as far as we shall judge convenient. See Fixed Points of Thermometers.

In the above method of graduating the scale, the bore of the tube is supposed to be perfectly cylindric, which cannot always be obtained. But though it be tapering or somewhat unequal, it is easy to manage that matter, in the manner proposed by the abbé Nollet (Leçons de Phyt. Exp. tom. iv. p. 376.) by making a small portion of the quicksilver, e. g. as much as fills up an inch or half an inch, slide backward and forward in the tube; and thus to find the proportions of all its inequalities, and from thence to adjust the divisions to a scale of the most perfect equality. See Observations on the Construction of Thermometers.

Other thermometers of a similar construction have been accustomed to common use, the scale of which is only a part of that above described. They have been made of a small fixed and portable form, and the tube with its annexed scale has been enclosed in another thicker glass hermetically sealed, in order to preserve it from injury. Mr. Ramden, at the desire and for the use of Mr. Hunter in his experiments on the heat of animals and vegetables, constructed very small thermometers, 10 or seven inches long, and not above two twelfths of an inch thick in the stem; having the external diameter very little larger than that of the stem, on which was marked the freezing point. The stem was embraced by a small ivory scale, so as to slide upon it easily, and retain any position. Upon the hollow surface of this scale were marked the degrees which were seen through the stem. Phil. Trans. vol. lviii. part. 1. p. 8.

Several varieties of thermometers are constructed for philosophical purposes. For comprehending the whole range of thermometrical temperature from the most intense artificial cold to the boiling point of mercury, it is necessary to be provided with a very long tube; but for most chemical purposes, it need only be graduated to about ten degrees above the boiling point, which will reach the temperature of most saline solutions when boiling. For experiments in intense cold, a spirit thermometer should be graduated about 100 degrees below °, and the lower extremity of the scale should be at some distance from the bulb, that the temperature may be observed without lifting the bulb out of any deep vessel that may contain the freezing mixture. The most delicate and sensitive thermometers are made with a very small bulb, scarcely larger than the stem, and a tube of an extremely narrow bore, not larger than a horse-hair. For chemical purposes also, the scale should either be scratched on the glass itself, or, as this is difficult to be seen in a common light, an ivory scale should be attached without reaching so low as the bulb, that the latter may be safely immersed in acid or corrosive liquors.
In 1733, M. de l'Ille of Peterburg constructed a mercury spirit thermometer (see fig. 4.) on the principles of Reaumur's spirit thermometer. In his thermometer, the whole bulk of quicksilver, when immersed in boiling water, is conceived to be divided into 10,000, or rather 100,000 parts ; and from this one fixed point, the various degrees of heat, either above or below it, are marked in these parts on the tube or scale, by the various expansion or contraction of the quicksilver in all the imaginable variety of heat. Dr. Martine apprehended it would have been better if M. de l'Ille had made the integer of 100,000 parts, or fixed point of freezing water, and from thence computed the dilatations or condensations of the quicksilver in those parts. All the common observations of the weather, &c. would have been expressed by numbers increasing as the heat increased, which is the more natural way; nor would there have been any great incongruity, or inconvenience, in expressing, after the manner of Reaumur, the few observations that occur below simple freezing by numbers of contraction below gr. 0, or 100,000. However, in practice, it will not be very easy to determine exactly all the divisions from the alteration of the bulk of the contained fluid. And besides, as glass itself is dilated by heat, though in a less proportion than quicksilver, so that it is only the excess of the dilatation of the contained fluid above that of the glass that is observable; if different kinds of glass be differently affected by a given degree of heat, this will make a seeming difference in the dilatation of the quicksilver in the thermometers, constructed in the Newtonian method, either by M. de Reaumur's or M. de l'Ille's rules. Accordingly, it has been found, that the quicksilver in thermometers, constructed in M. de l'Ille's way, has found at different degrees of the scale when immersed in thawing snow. In some it was at gr. 154, in others at 156, and in another at 158: and it appears by M. de l'Ille's own account, that his thermometers disagree considerably from one another. Celsius's thermometer has been chiefly used in Sweden, and hence it has been called the Swedish thermometer. The French chemists have lately adopted it, under the name of centigrade thermometer. See Fixed Points of Thermometers, and the table at the close of this article.

Thermometer, Metaline, is a name given to a machine composed of two metals, which, whilst it indicates the variations of cold and heat, serves to correct the errors that result from hence in the construction of pendulum clocks. Instruments of this kind have been contrived by Graham, Le Roy, in 1738, Ellicot, Harris, &c. See Compound Pendulum.

We have also an account of instruments of this kind invented by Morton, Frothingham, and Fitzgerald, in the Phil. Trans. vol. xiv. p. 689, vol. xlv. p. 129, and vol. li. p. 823; to which we must refer for a particular description of each, illustrated by figures.

M. de Luc has likewise described two thermometers of metal, which he uses for correcting the effects of heat upon a barometer, and an hygrometer of his construction connected with them. In one of these, a strong rod of well-hardened brass, supports upon an edge, at a convenient distance from the centre of motion, a lever, which holds the scale of the barometer suspended, and makes it rise or fall by the dilatation or condensation of the brass rod, as the quicksilver rises or falls in the barometer, by the corresponding variations of heat. This scale of the barometer, when it moves, draws or loosens a thread of slip-grafs, which goes over a small pulley placed upon the same axis with a much larger one, to which the scale of the hygrometer is hung likewise by a similar thread, which thus varies, by the proportion of the diameters of the pulleys, as the heat makes the quicksilver in the byrometer vary. This instrument is convenient for meteorological observations; because it faves one observation and two corrections for the heat; but it is necessary from time to time to correct an irregularity in it, which is easily perceived by means of an index, carried by the moveable scales of the two instruments, which, going over inmoveable scales of the same fort, shews their difference of height. When this difference is no longer con- formable to the indication of the thermometer, it is easily rectified by turning small pegs, on which is twisted the thread of slip-grafs, which serves for the suspension of the scales. The irregularity just mentioned confines in this, that when the heat, after having varied, returns to the same point of the quicksilver thermometer, the metallic thermometer does not return to it exactly, but varies nearly in the following manner: during the summer, the latter gains constantly on the former, i. e. amidst its variations, it always preservs a small part of the lengthening, which is at that time its ordinary state. In winter, on the contrary, it becomes insensibly a little too short. The other metallic thermometer, which is more curious than useful, on account of its greater irregularity, consists of a rod of lead, which, communicating by a thread of slip-grafs with a small pulley fixed to the same axis with a greater one, conducts, by means of another pulley; a needle through whole axis, which is bored, paffes another axis that carries the needles of a pulley barometer. Thus this instrument marks the heat and weight of the air upon two concentric circles, by means of two needles turning upon the same centre, as in clocks; by which, the needle of the thermometer points out upon a third circle the correction for the heat, to be made on the barometer. See Phil. Trans. vol. xxviii. part i. p. 437, &c.

Thermometers, Oil. To this class belongs sir Isaac Newton's thermometer, constructed in 1701, with linseed oil instead of spirit of wine. This liquor has the advantage of being sufficiently homogeneous, and capable of a considerable rarefaction, not less than fifteen times greater than that of spirit of wine. It has not been observed to freeze even in very great colds, and it is able to bear a great heat, about four times that of water, without boiling. With these advantages it was made use of by sir Isaac Newton, who discovered by it the comparative degree of heat for boiling water, melting wax, boiling spirit of wine, and melting tin; beyond which it does not appear that this thermometer was applied. The method he used for adjusting the scale of this oil-thermometer was as follows: supposing the bulb, when immersed in thawing snow, to contain 10,000 parts, he found the oil expanded by the heat of the human body so as to take up one thirty-ninth more space, or 10256 such parts; and by the heat of water boiling strongly, 10725; and by the heat of melting tin, 11516. So that, reckoning the freezing point as a common limit between heat and cold, he began his scale there, marking it gr. 0, and the heat of the human body he made gr. 12; and, consequently, the degrees of heat being proportional to the degrees of rarefaction, or 10256: 10725: 11516, that the heat of boiling water was expressed by gr. 34 = $\frac{725 \times 12}{256}$; and that of the melting tin by gr. 72. Phil. Tran. No. 270, or Abr. vol. iv. part ii. p. 3.

Although in this graduation for sir Isaac Newton does not specify any degree of cold below that of freezing water, yet it would be easy to prolong his scale downward below gr. 0, or the freezing point, and thus to adapt it for estimating greater degrees of cold, like other thermometers. But there is another insuperable inconvenience that attends all the-
thermometers made with oil, or any other viscid liquor, viz. that such a liquor adheres too much to the sides of the tube. In a sudden cold or fall of the oil, much of it flicks by the way, and only licks gradually afterwards, so that at first the surface appears really lower than the present temperature requires. And besides, as at all times some of the oil must continue to flick and moisten the inside of the tube, in different degrees of heat and cold, the oil, becoming alternately more or less viscid, will adhere sometimes more and sometimes less; and will, therefore, inevitably disturb the regularity and uniformity of the thermometer. Martine's Essays, Eff. iii.

**THERMOMETERS, Fixed Points of.** Various methods have been proposed by various authors, for finding a fixed point, or degree, of heat and cold, from which to reckon the other degrees, and adjust the scale; so that observations made at the same or different times, in different places, might be compared together. For want of this, notwithstanding all the numerous registries of the weather, &c., that have been kept and published by different authors, we are much at a loss to determine the comparative differences of heat and cold in different countries and climates, and the result of many other observations. If all the weather-records in the world had been made according to one determined scale, these inconveniences and uncertainties would have been prevented; which, indeed, are now unavoidable, and must still continue for all alike to grade their thermometers in the same manner, or at least define some fixed or unalterable points of heat, to which all the different scales of those instruments may be reduced. The honourable Mr. Boyle was very sensible of this inconvenience, and many lamented it; and he proposed the freezing of the essential oil of aniseed, as a term of heat and cold that might be of use in making and judging of thermometers, and so to graduate them from this point according to the proportional dilations or contractions of the included spirits. He mentioned also the coldness requisite to begin the congelation of distilled water as another fixed term that might be adopted; for he was persuaded, that among the ordinary waters, some were apt to freeze more easily than others. But he was deterred from prosecuting this scheme of fixing a standard for making and graduating all thermometers in the same way, experiments, &c. on cold, in his works abridged by Shaw, vol. i. p. 579.

Dr. Halley (Phil. Trans. Abr. vol. ii. p. 36.) seems to have been fully apprized of the bad effects of the indefinite method of constructing thermometers, and wished to have them adjusted to some determined points. What he seems to prefer for this purpose is the degree of temperature which is found in subterranean places, where the heat in summer and cold in winter appears to have no influence. But this degree of temperature is shewn by Dr. Martine to be a term for the universal construction of thermometers, both inconvenient, as it cannot be easily ascertained: and a precarious one, as the difference of soils and depths may occasion a considerable variation. Another term of heat which he thought might be of use in a general graduation of thermometers, is that of boiling spirit of wine that has been highly rectified: but a much more convenient term of heat, though less inflected on by Dr. Halley, is that of boiling water. The first trace that occurs of the method of actually applying fixed points or terms to the thermometer, and of graduating it, so that the unequal divisions of it might correspond to equal degrees of heat, is the project of Renaldinus, professor of Padua, in 1694: it is thus described in the Acta Erud. Lips. "Take a flender tube, about four palms long, with a ball fastened to the fame; pour into it spirit of wine, enough just to fill the ball, when surrounded with ice, and not a drop over: in this flat, seal the orifice of the tube hermetically, and provide twelve vessels, each capable of containing a pound of water, and somewhat more; and into the first pour eleven ounces of cold water, into the second ten ounces, into the third nine, &c.: this done, immerse the thermometer in the first vessel, and pour into it one ounce of hot water, observing how high the spirit rises in the tube, and noting the point with unity: then remove the thermometer into the second vessel, into which are to be poured two ounces of hot water, and note the place the spirit rises to with 2. By thus proceeding till the whole pound of water is spent, the instrument will be found divided into twelve parts denoting so many terms or degrees of heat; so that at 2 the heat is double to that at 1, at 3, triple, &c."

But this method, though plausible, Wallis shews, is deceitful, and is built on false suppositions; for it takes for granted, that we have one degree of heat, by adding one ounce of hot to eleven of cold water; two degrees, by adding two ounces to ten, &c.: it supposes, also, that a single degree of heat acts on the spirit of wine in the ball with a single force; a double with a double force, &c. lastly, it supposes, that if the effect be produced in the thermometer by the heat of the ambient air, which is here produced by the hot water, the air has the fame degree of heat with the water.

Soon after this project of Renaldinus, viz. in 1701, Mr. Isaac Newton constructed his oil thermometer, and fixed the base or lowest fixed point of his scale at the temperature of thawing snow, and twelve at that of the human body, &c. in the manner explained under the article Oil Thermometer.

M. de Luc observes, that the second term of his scale should have been at a greater distance from the first, and that the heat of boiling water would have answered this purpose better than that of the human body.

In 1702, M. Amontons contrived his universal thermometer, the scale of which was graduated in the following manner. He chose for the first term the weight that counterbalanced the air included in his thermometer, when it was heated by boiling water: and in this flat he so adjusted the quantity of mercury contained in it, till the sum of its height in the tube, and of its height in the barometer at the moment of observation, was equal to seventy-three inches. Fixing this number at the point to which the mercury in the tube rose by plunging it into boiling water, it is evident, that, if the barometer at this time was twenty-eight inches, the height of the column of mercury in the thermometer above the level of that in the ball was forty-five inches; but if the height of the barometer was less by a certain quantity, the column of the thermometer ought to be greater by the same quantity, and reciprocally. He formed his scale on the supposition that the weight of the atmosphere was always equal to that of a column of mercury of twenty-eight inches, and divided it into inches from the point 73 downwards, marking the divisions with 72, 71, 70, &c. and he subdivided the inches into lines.

But as the weight of the atmosphere is variable, the barometer must be observed at the same time with the thermometer, that the number indicated by this last instrument may be properly corrected, by adding or subtracting the quantity of which the mercury is below or above twenty-eight inches in the barometer. In this scale, then, the freezing point is at 51.5 inches, corresponding to 32 of Fahrenheit, and the heat of boiling water at 73 inches,
The fixed points of Fahrenheit's thermometer, which is generally used in Great Britain, as we have already observed under Mercurial Thermometer, are the congelation produced by salt ammoniac and the heat of boiling water. The interval between these points is divided into 212 equal parts; the first of these points is marked 0, 32 degrees below the freezing point, and the other 212; the distance of course between the freezing and boiling points being 180. The reason why Fahrenheit fixed his scale so far below the water-freezing point was founded on an erroneous hypothesis relative to the real zero or point of absolute privation of heat; nevertheless it has this advantage, that the distinction between the positive and negative terms, or those which express degrees above or below the zero, much less frequently occurs in any experiments, and scarcely ever in the register of natural cold in temperate climates, by which many accidental errors are avoided.

Reaumur, in his thermometer, the construction of which he published in 1730, and which is generally used in France and other parts of the continent, begins his scale at an artificial congelation of water in warm weather, which, as he uses large bulbs for his glasses, gives the freezing point much higher than it should be, and at boiling water he marks 80; (the distance between both points being 80,) which point Dr. Martine apprehends to be more vague and uncertain than his freezing point. The spirit in the thermometer, he observes, is absolutely incapable of such a great heat as Reaumur ascribed to it, and that not by a small or trifling difference. He finds, that highly rectified spirit of wine cannot be heated beyond gr. 175 in Fahrenheit's thermometer, while boiling water raises the quicksilver 37 degrees higher; and common brandy was able to conceive a heat no greater than about gr. 190. So far, he concludes, was Reaumur in the wrong, when he thought that all spirits, weak and strong, immerged in boiling water, received a given degree of heat, and that equal to the heat of the surrounding water. He supposes his standard heat could take a heat only of about gr. 180; less by 32 degrees than what he reckoned. In order to determine the correspondence of his scale with that of Fahrenheit, it is to be considered that his boiling-water heat is really only the boiling heat of weakened spirit of wine, coinciding nearly, as Dr. Martine apprehends, with Fahrenheit's gr. 180. And as his gr. 105 is the constant heat of the cave of the observatory at Paris, or Fahrenheit's gr. 53, he thence finds his freezing point, instead of answering just to gr. 32, to be something above gr. 34.

The thermometer of M. de l'Ile, of which he presented an account to the Academy of Sciences at Petersburg in 1733, has only one fixed point, which is the heat of boiling water, and, contrary to the common order, the several degrees are marked downwards from this point or zero, according to the condenfations of the contained quicksilver, and consequently by numbers increasing as the heat decreases to 150, the freezing point. In order to determine the extent of the degrees of this scale, M. de l'Ile first weighed the empty tube, and then weighed it full of mercury; and the difference of these two weights gave him that of the mercury. He then exposed the thermometer to the heat of boiling water, and took care to preserve the mercury, which this increase of heat forced out of it; this he accurately weighed, and deducting its weight from the total weight of the mercury, he made the remainder, or that which was left in the thermometer, equal to 10000; he then found by calculation how many 10000 parts of this residue that forced out of the tube contained, and these parts formed the divisions of the scale from the point, determined by the condenfation of the mercury to the same point at which it stood before it was plunged in boiling water, to the upper end of the tube; and these divisions formed the extent of the degrees of M. de l'Ile's scale. According to his standards, the freezing point, says Dr. Martine, is near to his gr. 150, corresponding to Fahrenheit's gr. 32, by which means they may be compared; but M. Ducreff says, that this point ought to be marked at least at gr. 154.

M. Ducreff, in his spirit thermometer, constructed in 1740, made use of two fixed points; the first, or 0, indicated the temperature of the earth, and was marked on his scale in the cave of the Royal Observatory at Paris; and the other was the heat of boiling water, which the spirit in his thermometer was made to endure, by leaving the upper part of the tube full of air. He divided the interval between these points into 100 equal parts; calling the divisions upwards degrees of heat, and those below 0 degrees of cold.

He afterwards regulated his thermometer by the degree of cold indicated by melting ice, which he found to be 105. In Celsius's, or the centigrade thermometer, the freezing point, like that of Reaumur's, was 0, the boiling point at 100, and the distance between both 100. See the table at the close of the article.

The Firenze thermometers made and used by the members of the famous academy del Cimento, being some of the first instruments of the fort, were vaguely graduated, some of them having many more degrees than others; but those of their most common graduation were of two forts; in one fort the freezing point, determined by the degree at which the spirit stood in the ordinary cold of ice or snow (probably in a thawing state), and coinciding with gr. 32 of Fahrenheit, fell at gr. 20; and in the other fort at gr. 13; and the natural heat of the viscera of cows and deer, &c, raised the spirit in the latter, or less, to about gr. 40, coinciding with their summer heat, and nearly with gr. 102 in Fahrenheit's, and in their other long thermometer, the spirit, when exposed to the great midsummer heat in their country, rose to the point at which they marked gr. 80. The freezing point of one was 20, the boiling point 174, and the distance between both was 154; in the other the freezing point was 13, the boiling point 81, and the distance 684.

In the Parisian thermometer, or the ancient thermometer of the Academy of Sciences, the freezing point was at 25, the boiling point at 239, and the distance between both 214.

In the thermometer of the observatory at Paris, made of spirit of wine by M. de la Hire, the spirit always stands at gr. 48, in the cave of the observatory, corresponding to gr. 53 in Fahrenheit's; and his gr. 28 corresponded with 51 inches fixed lines in Amonton's thermometer, and consequently with the freezing point, or gr. 32 of Fahrenheit's. This thermometer of De la Hire, which stood in the observatory of Paris above 60 years, seems to have been graduated thus; the freezing point 28, the boiling point 199, and the distance between both 171. In Amonton's thermometer the freezing point was 51, the boiling point 73, and the distance between them 218.

In the thermometer of Poleni, made after the manner of Amonton's, but with less mercury, 47 inches corresponding, according to Dr. Martine, with 51 in that of Amonton's, and 53 with 59. It was graduated thus; the freezing point at 47, the boiling point at 62, and the
the distance between them 15. In Crucquius's, the freezing point was 1070, the boiling point 1510, and the distance 440.

In the ancient standard thermometer of the Royal Society, after which thermometers were for a long time constructed in England, Dr. Martine found that gr. 34, answered to gr. 54 in Fahrenheit's, and gr. 0 to 89 or 88. From that point the number ascended and descended thus; the freezing point was 735, the boiling point 1415, and the distance between them 2155. In Sir Isaac Newton's, the freezing point was 0, the boiling point 34, and the distance 35.

In the thermometers graduated for adjusting the degrees of heat proper for exotic plants, &c. in flowerbeds and green houses, the middle temperature of the air is marked at gr. 0, and the degrees of heat and cold are numbered both above and below. Many of these are made on no regular and fixed principles. But in that formerly much used, called Fowler's regulator, the spirit fell, in melting snow, to about gr. 34 under 0; and Dr. Martine found, that his gr. 16 above 0, coincided with nearly gr. 64 of Fahrenheit. His 0 seems to have coincided with about the 53d or 54th degree of Fahrenheit's, and from that point the number ascended and descended thus; the freezing point 34, the boiling point 2501, and the distance between them 2844.

Dr. Hales (Statical Essays, vol. i. p. 53.) in his thermometer made with spirit of wine, and used in experiments on vegetation, began his scale with the lowest degree of freezing, or gr. 32 of Fahrenheit, and carried it up to gr. 100, which he marked where the spirit, when the bulb was heated in hot water, on which wax swimming first began to coagulate, and this point Dr. Martine found to correspond with gr. 142 of Fahrenheit. But by experience Hales's gr. 100 falls considerably above our gr. 142. According to others, his freezing point was 0, his boiling point 163, and the distance of course 163.

In the Edinburgh thermometer, made with spirit of wine, and used in the meteorological observations published in the Medical Essays, the scale is divided into inches and tenths. In melting snow the spirit stood at 83, and the heat of the human skin raised to 23 °. Dr. Martine found, that the heat of the person who graduated it was gr. 97 of Fahrenheit. It seems to have been graduated thus; the freezing point 81, the boiling point 47, and the distance between them 38.

As it is often of use to compare different thermometers, in order to judge of the result of former observations, we have annexed from Dr. Martine's Essays, the table by which he compared fifteen different thermometers. See Plate XVII. Pneumatics, fig. 4. See also the table at the close of this article.

There is a thermometer which was formerly much used in London, called the thermometer of Lyons, because M. Griffis brought it there into use, which is made of mercury; the freezing point is marked gr. 0, and the interval from that point to the heat of boiling water is divided into 100 equal degrees.

From the above abstract of the history of the construction of thermometers, it appears that freezing and boiling water have furnished the distinguishing points that have been marked upon almost all thermometers. The inferior fixed point is that of freezing, which some have determined by the freezing of water, and others by the melting of ice; and though the difference between these two temperatures is not commonly very considerable, yet it is not invariable.

It is now well known, that all, or almost all bodies, by changing from a fluid to a solid state, or from the state of an elastic to that of an unstable fluid, generate heat; and that cold is produced by the contrary process.

In order to obtain this fixed point or limit, melting ice, or ice powdered and mixed with water, will produce the same temperature. And though there may be some trifling difference between the temperature of ice disposed to melt, and that of melted ice or the water produced by it; this difference, however, has no sensible effect on the thermometer; consequently, the temperature of water successively produced by ice, and accumulated in its interstices, or from powdered ice mixed with the water which is produced by it in melting, affords, as De Luc observes, a fixed point, which is easily obtained, and which should be adopted in the construction of all thermometers.

The superior fixed point of almost all thermometers, is the heat of boiling water; but this point cannot be considered as fixed, unless the heat be produced by the same degree of boiling, and under the same weight of the atmosphere. With regard to the first circumstance, it is observed, that water, when it begins to boil, has not attained to its greatest degree of heat, which is known by its bubbling or foaming from the bottom of the vessel, and over the whole surface of the water, with the greatest violence which it is capable of acquiring; and in this state the water discovers an augmentation of heat more than one degree above the heat it had when it began to boil. The temperature of water which boils with vehemence should, therefore, be the standard of the fixed point of thermometers; nevertheless it is to be considered farther, that this degree of heat with which water violently boils, is invariably the same, only under a given pressure of the atmosphere; but if the pressure be diminished or increased, the boiling heat is diminished or increased. It is well known that water, placed under the exhausted receiver of an air-pump, will be converted into steam with a degree of heat far inferior to that which is necessary to its boiling in the open air; and under the pressure of its own vapour, confined in Papin's digester, it is said to sustain a degree of heat, without boiling, far exceeding that which, in the open air, would convert it into steam. Hence it follows that, in climates where the pressure of the atmosphere is liable to considerable change, the heat of boiling water, in open air, will be different at different times. Consequently thermometers, made in different states of the barometer, will disagree; unless allowance has been made for the effect of the variation of the barometer upon accurate principles. That the heat of boiling was variable, according to the pressure of the atmosphere, seems to have been known to Fahrenheit as early as the year 1724. See Phil. Tran. vol. III. p. 148.

Some time after this period, Meffrs. Monnier and Cafrini (Mem. de l'Acad. des Sc. for 1740) made some decisive observations, in order to shew that this quantity was very considerable.

M. de Luc, in 1762, made a much more complete series of experiments, which he has described and reduced into a system in his Recherches fur les Mod. de l'Atmosphère, vol. i. p. 382, &c. vol. ii. p. 383, &c. and these have been since verified by Sir George Shuckburgh, in 1775 and 1778. See Phil. Tran. vol. LXIX. part ii. p. 362, &c.

M. de Luc fixes the boiling point of his thermometer when the barometer is at 27 Paris, or 28.75 English inches, that being its mean height at Geneva. He divides the fundamental interval, i.e. the whole extent of the scale, between melting ice and boiling water, after the French manner, into eighty equal parts; and by a great number of experiments
periments on the heat of boiling water, at different heights above the level of the sea, he hath found, that the height of his thermometer, plunged in boiling water, may be expre
s
sed, in all states of the barometer, by the following formula, viz.

\[
\log y - a = T
\]

in which \(y\) denotes the height of the thermometer in sixteenths of a Parifian line, \(T\) the height of a thermometer, plunged in boiling water, above melting ice, in hundredths of a degree of his scale; and \(a\) the con
stant number 10387.

By logarithms he always makes the tabular or Briggian logarithms, and considers the seven figures given by the tables, besides the index, as integral figures, \(i.e.\) he considers the eighth figure of the logarithm as standing in the place of units. But as it is more usual with mathematicians, and, in general, more convenient, to consider all the figures after the index as decimals, the number which M. de Luc expresses by \(99 \frac{x}{100} \log y\), would in that case be

\[
99 \times \frac{x}{100} \log y \quad \text{or} \quad 99 \times \frac{3}{50} \log y
\]

However, in the sequel, M. de Luc's notation is retained.

Now if care were taken by the above formula, or in any other way, to adjust the boiling point to the main height of the barometer in every country, the instruments of the same country would always be consistent; but those of different countries would still disagree; that is, they would express the same temperature differently, though their similar intervals should be similarly divided; for in every scale, the number of degrees above or below melting ice, by which any given temperature is expressed, will be as the value of each degree inverely; that is, if each be a given part of the fundamental interval, as the value of the fundamental interval inverely; but if the degrees of different scales be different parts of the fundamental intervals, as the value of the fundamental interval inverely, and the number of degrees contained in it directly.

In order, therefore, to compare the thermometers of different countries, the proportions of their fundamental intervals to each other must be ascertained, or we must have some means of finding, upon one scale, the place of the boiling point of another. For this purpose, a general solution is requisite of the following problem, viz. the fundamental interval being given for a given height of the barometer, to find the fundamental interval for any other given height of the barometer. The solution is furnished by M. de Luc's rechanges; and his formula, above given, is reduced to English measures, and adapted to English instruments, by Dr. Horsley. As the subject is curious and important, we shall subjoin the process he has pur
sued for this purpose. It is but seldom that the barometer in this country stands so low as 27 Paris inches. Its main height upon the plain country about London is near 30 English inches. It may, therefore, be proper for the London workmen to fix their boiling point when the barometer is at 30 inches. Fahrenheit's division of the scale, which makes 180 degrees between melting ice and boiling water, and places the point \(\theta\) at the 32d degree below melting ice, may be retained; and the thermometer thus constructed is called by Dr. Horsley, Bird's Fahrenheit, because Mr. Bird, he apprehends, is the first workman who took the pains to attend to the state of the barometer in making thermometers, and has always fixed the boiling point when his barometer has stood at 30 inches. \(T\), then, being put for the height of a thermometer plunged in boiling water, above melting ice, in 100ths of a degree of De Luc's scale, in any given state of the barometer; let \(\theta\) denote the same height in 100ths of a degree of Bird's Fahrenheit; put \(y\) for the height of the barometer, in 16ths of a Paris line; \(z\), for its height in Paris lines; \(x\), in 10ths of a Paris inch; \(x\), in 10ths of an Eng
lish inch; and for \(10387\) put \(a\); for 16, \(b\); for 10, \(c\); for \(12, d\); and let \(E\) and \(F\) represent numbers expressing the proportion of the English foot to the French foot. M. de Luc hath found that, whatever be the value of \(y\),

\[
99 \log y - a = T
\]

But \(\log y = \log v + \log b\); and \(\log v = \log x + \log d - \log c\); and \(\log x = \log z + \log E - \log F\); therefore \(\log y = \log z + \log E + \log d + \log b - \log F - \log c\); and

\[
99 \log y - a = T
\]

or \(99 \log y = 10387 - a\). But \(99 \log E + \log d + \log b - \log F - \log c - 4171.55\); the French foot being to the English as 2.1345 to \(T\). Therefore \(\frac{99}{100} \log z = - 4171.55 + \frac{99}{200000} \log z = - 4171.55 = T\); and \(\frac{99}{100} \log z = \frac{T}{200000}\)

is the height of the thermometer, plunged in boiling water, above melting ice, in degrees of De Luc's scale, when the height of the barometer in tenths of an English inch, is \(z\). For \(z\) write 300; then \(\frac{T}{200000} = 80.902\); which is therefore the height of the thermometer, in boiling water, above melting ice, in degrees of De Luc's scale, when the barometer is at 30 inches English. And in the same state of the barometer, the height of the thermometer plunged in boiling water, above melting ice, in degrees of Bird's Fa
renheit, or \(\frac{1}{180}\), is 180. Hence the numbers \(T\) and \(\theta\)

are in the constant proportion of 809 and 1800, whatever be the value of \(z\). For the change produced in the heat of boiling water, by any change of \(z\), being always the same for both thermometers, the temperature expressed by \(T\) in parts of one scale is always the same, as \(\theta\) ex
presses in parts of the other; and therefore putting \(\frac{1}{L}\) and \(\frac{1}{B}\) for the values of the 100th part of a degree of the scales of De Luc and Bird respectively, the fractions \(\frac{T}{100} \theta\)

are always equal, and \(T\), \(\theta\) are in the constant propor
tion of the invariable numbers \(L\), \(B\): consequently, when the proportion of \(T\) and \(\theta\) is determined for any particular value of \(z\), it is found generally for all: consequently \(T\), \(\theta\)

:: 809 : 1800. And \(T = \frac{809}{1800} \theta = \frac{899}{2000} \theta \) very nearly in all values of \(z\); and substituting this value for \(T\) in the equation
THERMOMETER.

Equation exhibiting the relation between \( z \) and \( T \), we have,

\[
T = \frac{899}{2000 \times 100} \log z - \frac{92.804}{100} = \text{the height of the thermometer in boiling water, above melting ice, in degrees of Bird's Fahrenheit, when the height of the barometer in tenths of an English inch, is } z. \quad \text{And thus M. de Luc's formula, for the variation of the boiling point, is adapted to English instruments, and reduced to English measures of length.}
\]

For \( z \) write 287.7525, the length of 27 French inches in tenths of an English inch, and \( \theta \), the height of De Luc's boiling point above melting ice, in degrees of Bird's Fahrenheit, comes out 177.989. Hence M. de Luc's boiling point falls upon 209.989 of Bird's scale, i.e. upon 210 very nearly, or infensibly more than two degrees below Bird's point of boiling. But as 899 is a troublesome divisor, the computation will be more easy and expeditious, by writing

\[
\frac{11}{1000000} \text{ log. } z = s. \quad \text{Then } s + \frac{1}{900} = 92.804 = \theta \text{ very nearly.}
\]

Upon these principles Dr. Horfley has computed the table following, for finding the heights to which a good Bird's Fahrenheit will rise, when plunged in boiling water, in all states of the barometer, from 27 to 31 English inches; which will serve, among other uses, to direct instrument-makers in making a true allowance for the effect of the variation of the barometer, if they are obliged to finish a thermometer, when the barometer is above or below 30 inches; though it is best to fix the boiling point when the barometer is at the height prescribed.

Equation of the Boiling Point.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>31.0</td>
<td>+ 1.57</td>
<td>0.78</td>
</tr>
<tr>
<td>30.5</td>
<td>+ 0.79</td>
<td>0.79</td>
</tr>
<tr>
<td>30.0</td>
<td>0.00</td>
<td>0.80</td>
</tr>
<tr>
<td>29.5</td>
<td>- 0.80</td>
<td>0.82</td>
</tr>
<tr>
<td>29.0</td>
<td>- 1.62</td>
<td>0.83</td>
</tr>
<tr>
<td>28.5</td>
<td>- 2.45</td>
<td>0.85</td>
</tr>
<tr>
<td>28.0</td>
<td>- 3.31</td>
<td>0.86</td>
</tr>
<tr>
<td>27.5</td>
<td>- 4.16</td>
<td>0.88</td>
</tr>
<tr>
<td>27.0</td>
<td>- 5.04</td>
<td>0.88</td>
</tr>
</tbody>
</table>

The Royal Society, fully apprized of the importance of adjusting the fixed points of thermometers, appointed a committee of seven gentlemen to confider the best method for this purpose; and their report is published in the Phil. Trans. vol. lxvi. part ii. art. 37. From a variety of experiments and observations, relating to this subject, the committee have deduced the following practical rules, which they recommend in adjusting the fixed points of thermometers. The most accurate way of adjusting the boiling point is, not to dip the thermometer into the water, but to expose it only to the steam, in a vessel closed up in the manner represented in Plate XVI. Pneumatics, fig. 5, where A B c is the vessel containing the boiling water, D d the cover, E a chimney made in the cover intended to carry off the steam, and M M the thermometer paffed through a hole in the cover. In the pursuit of this method the following particulars must be regarded: the boiling point must be adjusted when the barometer is at 29.8 inches; and the thermometer must be kept in the manner.

Sir George Shuckburgh has also subjoined the following general table for the use of artists in constructing the thermometer, both according to his own observations, and those of M. de Luc.

<table>
<thead>
<tr>
<th>Height of the Barometer</th>
<th>Corrected Boiling Point</th>
<th>Difference</th>
<th>Correct accord. to M. de Luc.</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inch.</td>
<td>Deg.</td>
<td></td>
<td>Deg.</td>
<td></td>
</tr>
<tr>
<td>26.0</td>
<td>6.09</td>
<td>-6.83</td>
<td>.90</td>
<td></td>
</tr>
<tr>
<td>26.5</td>
<td>6.18</td>
<td>-5.93</td>
<td>.89</td>
<td></td>
</tr>
<tr>
<td>27.0</td>
<td>5.27</td>
<td>-5.04</td>
<td>.88</td>
<td></td>
</tr>
<tr>
<td>27.5</td>
<td>4.37</td>
<td>-4.16</td>
<td>.87</td>
<td></td>
</tr>
<tr>
<td>28.0</td>
<td>3.48</td>
<td>-3.31</td>
<td>.86</td>
<td></td>
</tr>
<tr>
<td>28.5</td>
<td>2.59</td>
<td>-2.45</td>
<td>.85</td>
<td></td>
</tr>
<tr>
<td>29.0</td>
<td>1.72</td>
<td>-1.62</td>
<td>.82</td>
<td></td>
</tr>
<tr>
<td>29.5</td>
<td>0.85</td>
<td>-0.80</td>
<td>.80</td>
<td></td>
</tr>
<tr>
<td>30.0</td>
<td>0.00</td>
<td>.85</td>
<td>.79</td>
<td></td>
</tr>
<tr>
<td>30.5</td>
<td>0.85</td>
<td>.79</td>
<td>.78</td>
<td></td>
</tr>
</tbody>
</table>

The numbers in the first column of this table express heights of the quicksilver in the barometer in English inches and decimal parts: the second column shews the equation to be applied, according to the sign prefixed, to 212° of Bird's Fahrenheit to find the true boiling point for every such state of the barometer. The boiling point for all intermediate states of the barometer may be had with sufficient accuracy by taking proportional parts, by means of the third column of differences of the equations.

(See Phil. Trans. vol. lxx. part i. art. 30. See also an excellent paper on this subject by Dr. Magleyne, in the Phil. Trans. vol. lxxiv. part i. art. 20.) In the following table we have the result of fifteen different observations made by Sir George Shuckburgh (ubi supra) compared with the result of M. de Luc's rules.
The ball of the thermometer must be placed at such a depth within the pot, that the boiling point may rise very little above the cover; and the surface of the water in the pot should be at least one or two inches below the bottom of the ball. Care must be taken to fill up the hole in the cover through which the tube is inserted, and to make the cover fit pretty close, so that no air shall enter into the pot that way, and that not much steam may escape. A piece of thin flat tin-plate must also be laid on the mouth of the chimney, so as to leave no more passage than what is sufficient to carry off the steam.

If the artist pleases, he may tie each corner of this plate by a string to prongs fixed to the chimney, and standing on a level with the plate, as it will be thus always kept in its place.

Fig. 7, is a perspective view of the chimney and tin-plate; A, B, C, D is the plate, E the chimney, F, G, H, M, and N, the prongs fastened to the chimney, to which the four corners of the plate are to be tied by the strings A, B, C, D, and M, N; the ends F, G, M, and N, of the prongs must be on a level with the plate, and the prongs should not be stretched tight. The chimney ought not to be less than half a square inch in area, and not less than two or three inches in length. The cover should be made to take on and off easily, and a ring of woollen cloth may be placed under it, so as to lie between it and the top of the pot. The hole in the cover may be filled up by a cork, with a hole bored through it, big enough to receive the tube, and then cut into two, parallel to the length of the tube. Another method. more convenient in use, but not so easily made, is represented in Fig. 8, which exhibits a perspective view of the apparatus: A, H is the cover, H the hole through which the thermometer is passed, B a flat piece of brass fixed upon the cover, and D, E, F a sliding piece of brass, made so as either to cover the hole H or to leave it uncovered, as in the figure, and to be tightened in either position by the screw s sliding in the slit M; also in the edge D, E, to enclose the tube of the thermometer: pieces of woollen cloth should also be fastened to the edges B, and D, E, and also to the bottom of the sliding piece D, E, unless that piece and the cover are made sufficiently flat to prevent the escape of the steam. In order to keep the thermometer suspended at the proper height, a clip may be used like that represented in Fig. 9, which, by the screw s, must be made to embrace the tube tightly, and may rest on the cover.

Another method, which is rather more convenient, when the top of the tube of the thermometer is bent into a right angle, in the manner often practised at present for the sake of more conveniently fixing it to the scale, is represented in Fig. 10: G, F, G, F is a plate of brass standing perpendicularly on the cover, and L, N a piece of brass bent at the bottom into the form of a loop, with a notch in it, so as to receive the tube of the thermometer, and to suffer the bent part to rest on the bottom of the loop; this piece must slide in a slit K, K, in the plate L, N, and be tightened at any height by the screw T.

Moreover, it is best to make the water boil pretty briskly, as otherwise the thermometer is apt to be a great while before it acquires its full heat, especially if the vessel is very deep; and the observer should wait at least one or two minutes after the thermometer appears to be stationary, before he concludes that it has acquired its full height.

Another way of adjusting the boiling point is to try it in a vessel of the same kind as the former, only with the water rising a little way, viz. from one to three or four inches above the vessel, taking care that the boiling point shall rise very little above the cover. In this method there is no need to cover the chimney with the tin-plate, and there is less need to make the cover fit close, unless to prevent the operator from being incommoded with the steam. The height of the barometer in this method is 29.1 inches.

It will be convenient to have two or three pots of different depths for adjusting thermometers of different lengths. A third way of adjusting the boiling point is to wrap several folds of linen rags or flannel round the tube of the thermometer, and to try it in an open vessel, taking care to pour boiling water on the rags, in order to keep the quicksilver in the tube as nearly of the heat of boiling water as possible. In this method the barometer should be at 29.8 inches; the water should boil fast, and the thermometer should be held upright, with its ball two or three inches under water, and in that part of the vessel where the current of water ascends.

Whichever of these methods of adjusting the boiling point is used, it is not necessary to wait till the barometer is at the proper height, provided the operator will take care to correct the observed height according to the following table.

<table>
<thead>
<tr>
<th>Height of the Barometer when the Boiling Point is Adjusted according to the Method.</th>
<th>Correction in thousandths of the Interval between 32° and 212°.</th>
<th>Height of the Barometer when the Boiling Point is Adjusted according to the Method.</th>
<th>Correction in thousandths of the Interval between 32° and 212°.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>2d</td>
<td>1st</td>
<td>2d</td>
</tr>
<tr>
<td>30.66</td>
<td>10</td>
<td>29.69</td>
<td>29.39</td>
</tr>
<tr>
<td>30.71</td>
<td>11</td>
<td>30.71</td>
<td>29.39</td>
</tr>
<tr>
<td>30.78</td>
<td>3</td>
<td>29.38</td>
<td>29.39</td>
</tr>
<tr>
<td>31.80</td>
<td>7</td>
<td>31.80</td>
<td>29.39</td>
</tr>
<tr>
<td>32.90</td>
<td>5</td>
<td>32.90</td>
<td>29.39</td>
</tr>
<tr>
<td>33.90</td>
<td>3</td>
<td>33.90</td>
<td>29.39</td>
</tr>
<tr>
<td>34.90</td>
<td>1</td>
<td>34.90</td>
<td>29.39</td>
</tr>
<tr>
<td>35.90</td>
<td>0</td>
<td>35.90</td>
<td>29.39</td>
</tr>
</tbody>
</table>

In using this table, seek the height of the barometer in the column answering to the method of adjusting the boiling point, the corresponding number in the third column shows how much the point of 212° must be placed above or below the observed point: e.g. supposing the boiling point to be adjusted in them when the barometer is at 29 inches, and that the interval between the boiling and freezing points is 11 inches; the nearest number to 29 in the left-hand column is 29.03, and the corresponding number in the table is 7 higher, and therefore the mark of 212° must be placed higher than the observed point by 1000ths of the interval between boiling and freezing, i.e. by \( \frac{11 \times 7}{1000} = 0.77 \) of an inch. This method of correcting the boiling point is not strictly just, unless the tube is of an equal bore in all its parts; but the tube is seldom so unequal as to cause any sensible error, where the whole correction is so small. The trouble of making the correction will be abridged by a diagonal scale, such as is represented in Fig. 10.

Although it is of no great consequence what kind of water is used in adjusting the boiling point, so that it is not hot,
It is observed, that though the boiling point be placed so much higher on some of the thermometers now made than on others, this does not produce any considerable error in the observations of the weather, at least in this climate; for an error of 1° in the position of the boiling point, will make an error only of half a degree in the position of 92°, and of not more than a quarter of a degree in the point of 62°.

It is only in nice experiments, or in trying the heat of hot liquors, that this error in the boiling point can be of much significance.

In adjusting the freezing, as well as the boiling point, the quicksilver in the tube ought to be kept of the same heat as that in the ball. When the freezing point is placed at a considerable distance from the ball, the pounded ice should be piled to such a height above the ball, that the error which can arise from the quicksilver in the remaining part of the tube, not being heated equally with that in the ball, shall be very small, or the observed point must be corrected on that account, according to the following table:

<table>
<thead>
<tr>
<th>Heat of the Air</th>
<th>Correction</th>
</tr>
</thead>
<tbody>
<tr>
<td>42°</td>
<td>-00087</td>
</tr>
<tr>
<td>52°</td>
<td>-00174</td>
</tr>
<tr>
<td>62°</td>
<td>-00261</td>
</tr>
<tr>
<td>72°</td>
<td>-00348</td>
</tr>
<tr>
<td>82°</td>
<td>-00435</td>
</tr>
</tbody>
</table>

The correction in this table is expressed in 1000th parts of the distance between the freezing point and the surface of the ice: e.g. if the freezing point stands seven inches above the surface of the ice, and the heat of the room is 62°, the point of 32° should be placed at 7 x 0.00261, or 0.018 of an inch lower than the observed point. A diagonal scale will facilitate this correction.

The committee observe, that in trying the heat of liquors, care should be taken that the quicksilver in the tube of the thermometer be heated to the same degree as that in the ball; or if this cannot be done conveniently, the observed heat should be corrected on that account; for the manner of doing which, and a table calculated for this purpose, we must refer to their excellent report in the Phil. Trans. vol. lxxii. part ii. art. 37.

Several experiments made by governor Hutchins, at Albany Fort, in Hudson's Bay, in 1782, in pursuance of a method suggested by Dr. Black and Mr. Cavendish, and for which he obtained Sir Godfrey Copley's medal from the Royal Society in 1783, have not only confirmed the observations before made, relative to the solid state into which quicksilver can be brought by cold, its metallic splendour and polish when smooth, its roughnesses and crystallization where the surface was unconfined, its malleability, softness, and droll found when fric Peace. but have also clearly demonstrated, that its point of congelation is no lower than 40°, or rather 39°, of Fahrenheit's scale; that it will bear, however, to be cooled a few degrees below that point, to which it jumps up again on beginning to congeal; and that its rapid deposit in a thermometer, through many hundred degrees, when it has once passed the above-mentioned limit, proceeds merely from its great contraction in the act of freezing. See Phil. Trans. vol. lxii. part ii. art. 20, 20, 21.

Thermometers, Observations on the Construction of. It is absolutely necessary that those who would derive any advantage from these instruments, should agree in using the same liquor, and in determining, according to the same method, the two fundamental points. If they agree in these fixed points, it is of no great importance whether they divide the interval between them into a greater or less number of equal parts. The scale of Fahrenheit, in which the fundamental interval between 212°, the point of boiling water, and 32°, that of melting ice, is divided into 180 parts, should be retained in the northern countries, where Fahrenheit's thermometer is used: and the scale, in which the fundamental interval is divided into 80 parts, will serve for those countries where the thermometer of M. de Réaumur is adopted. But no inconvenience is to be apprehended from varying the scale for particular uses, provided care be taken to signify into what number of parts the fundamental interval is divided, and the point where 0 is placed.

With regard to the choice of tubes, it is most desirable to have them exactly cylindrical through their whole length. See Mercurial Thermometer.

The kapillary tubes are preferable to others, because they require less bulbs, and they are also less brittle, and more sensible. Those of the most convenient size for common experiments are such as have their internal diameter about the fourth of a line: and those made of thin glass are better than others, as the rise and fall of the mercury may be more distinctly perceived. The length of nine inches will serve for all common occasions; but for particular purposes, the length both of the tubes and of the divisions should be adapted to the uses for which they are designed.

In determining the best size of the balls or bulbs, it has been usual to compare new tubes with such thermometers as are well proportioned. But M. Durand has proposed a formula for finding the proportion which the balls ought to bear to their respective tubes. With this view he expresses the length of the tube, measured in diameters of itself, by a; the whole capacity of the ball and tube by c; the capacity of the fundamental interval, expressed in the same parts with the whole capacity, by d; the number of degrees of the fundamental interval by m; the number of other degrees which the scale is to contain, besides those of the fundamental interval both above and below it, by n; and the diameter of the ball measured in diameters of the tube by b: and b = \sqrt{\frac{\pi}{6} \frac{a \times \frac{c}{m}}{d \times m + n}} - 1. For two cylinders having equal bases being as their heights, m : n :: d : m, which is the capacity of that part of the tube which exceeds the fundamental interval, to which adding d, that interval, we have the total capacity of the tube = \frac{d_n + d_m}{m}. Subtracting this from c, we shall have the capacity of the ball = c - \frac{d_n + d_m}{m} = \frac{c \times m - d_m - d_n}{m}. If this quantity be divided by the capacity of the tube, the quotient will shew how often the capacity of the ball contains that of the tube; and this quotient is = \frac{1}{m}.
cylinder having \( a \) diameters of the tube, for their respective heights, and \( d \) diameter for the base, as are contained in this last quotient; and, therefore, its cylindric solidity expressed in the cylindric solidities of the tube will be \( a \times \frac{c m - d m - d n}{d m + d n} \). But the diameter of this ball is equal to the base of the cylinder in which it may be inscribed, and the solidity of this cylinder is equal to \( \frac{a}{2} \times \frac{c m - d m - d n}{d m + d n} \); and the diameter of its base equal to the diameter of the ball, will be

\[
\sqrt{\frac{a}{2} \times \frac{c m - d m - d n}{d m + d n}} \text{ or } \sqrt{\frac{a}{2} \times \frac{c m}{d \times m + n} - 1}.
\]

It is evident that, ceteris paribus, the larger the bulb is, in proportion to the diameter of the cavity of the tube, or the narrower the latter is in proportion to the former, the greater will the motion of the surface of the fluid be in the tube. But it must be observed, that when the bulb is very large, the thermometer will not easily arrive at the precise temperature of any place, wherein it may be situated. Some persons, in order to give the bulb a greater surface, and of course to render it more capable of readily attaining a given temperature, have made it not globular, but cylindric (which shape was adopted by Fahrenheit), or flat, or bell-like, &c.; but those shapes are improper, because they are liable to be altered by the varying gravity of the atmosphere, consequently those thermometers cannot be accurate. The bulb should be clean and colourless; since coloured surfaces are apt to be partially heated by a strong light. If you take two equal thermometers, and paint the bulb of one of them black, or of any dark colour, and expose them both to the fun; the mercury in that whole bulb is painted will rise several degrees higher than in the other; even a strong day-light, independently of the direct rays of the sun, will affect them differently. The ball of the thermometer should not be in contact with the substance of the scale, lest it should be influenced by the temperature of that substance.

When a proper tube and ball are procured, and their proportion ascertained, the next object which requires peculiar attention is that of filling the thermometer. For this purpose the tubes should be clean and dry, and the mercury very pure. (See Mercury and Barometer.) The mercury may be introduced into the tube by means of a kind of reflow fixed at the top of it, and proportioned in size to the bulk of the ball, or by rolling upon the tube a strip of fine paper, about two or three inches broad. In order to clear the tube of its air and moisture, it should be held over a gentle fire, so disposed, as that it may heat at once the whole extent of the tube, till its heat becomes too great for the operator's hand to bear, who therefore uses a glove or nippers for this purpose; care being taken that the ball is not heated at the same time. After the inclosed air is thus rarefied, and the particles that might obstruct the free motion of the mercury are made to float in vapours within the bore of the tube, the tube is to be held upright, and the ball suddenly heated, by which means the air contained in it will be dilated, and carry off the impurities of the tube, so that it will be rendered clean and free from air. When the ball is heated to a considerable degree, the mercury may be poured into the reflow fixed at the top of the tube, through a small corner of the paper. When the reflow is almost full, the ball should be withdrawn from the fire, and the air will then be condensed, and the space left by it will be soon occupied by the mercury. By alternately heating and cooling the ball, it may thus be filled with mercury; but when it is nearly full, the mercury contained in it must be made to boil, by placing it over burning coals, in order to purge it of its air. However, as a small quantity of air will be left in the ball after this operation, it will be expedient to remove the mercury, which remains in the reflow, immediately after the thermometer is withdrawn from the fire; and thus the whole column, unsupplyed with mercury from the reflow, will descend into the ball by the condensation of that which is contained in it, and the tube being empty, the small bubble of air will escape. Let the tube be again heated successively through its whole length, commencing from the bottom, and preferring the heat of the ball, that the mercury may occupy it entirely, and no air be allowed to enter. During this operation, when the mercury of the thermometer begins to appear in the reflow, let the mercury contained in a paper funnel be poured into it in such a quantity as will more than fill the thermometer, which is then to be removed from the fire. The mercury of the tube, and that discharged from the funnel, will unite, and pass together into the thermometer, and thus it will be wholly filled. In this state it may be left for any time at pleasure, without any apprehension of its imbiving either air or moisture. Nothing now remains but to get rid of the superfluous quicksilver, and to seal the tube. For this purpose the thermometer is held in the hand and heated, till a drop of mercury falls out of it, and is then left to recover the temperature of the air; by which means there will remain at the top of the tube a small empty space. Then with a blow-pipe and the flame of a candle, let the end of the tube be formed into a fine point, of such a length as will admit of its being properly sealed. When this preparatory process is completed, let the thermometer be gradually plunged into boiling water, so that the superfluous mercury may issue from it slowly; and when it ceases to be discharged, withdraw the thermometer from the boiling water; wipe it dry, and as soon as possible, put the ball of it over a small fire, covered with ashes, and previously prepared for the purpose. In this part of the operation, it is necessary to be quick, that the mercury may not have time to condense, and the air enter into the tube. In this state the thermometer may be left to heat, till it parts with more or fewer drops of the mercury, according to the proportion which the length of the tube bears to that of the scale applied to it. The thermometer is then sealed, by melting only the end of the point above mentioned, and at the flame instant withdrawing it from the fire.

The method of filling the thermometer with a paper tube, or funnel, is as follows. Let the ball be heated, so that the mercury may rise to the top of the tube; whilst it approaches it, apply the tube of paper to the end of the tube, so that it may serve for a reflow. The thermometer being placed near the fire, so that it may always preserve the same degree of dilatation, take some well purified mercury in a paper cornet, and communicate a little more heat to the ball. When the mercury rises, and forms a small drop at the end, pour the mercury of the cornet into the reflow of paper, and withdraw the ball from the fire. Having removed the paper reflow, place the ball again over the fire, and seal the point of the tube at the moment when the mercury rises to it, and withdraw the thermometer from the fire. This operation will be acquired by use.

Vol. XXXV.
Thermometers that are designed for measuring great degrees of heat, require to be filled with particular precautions, which M. de Luc has minutely described.

When the thermometer is filled and sealed, nothing more is necessary than to mark the two fixed points, graduate the scale, and attach it to a proper frame. See de Luc’s Récherches, &c. vol. i. p. 393, &c.

The frame may be made of any substance, or kind of wood, at pleasure: and the degrees may be marked on metal or wood, or paper, or ivory, &c.; but such substances should be preferred for the scales of thermometers as are not apt to be bent or shortened, or otherwise altered by the weather, especially if the instruments are not defended by a glass case, or by a box with a glass face. Thermometers for indicating the temperature of the atmosphere need not have scales that are much extended; if they go as high as 150° it is sufficient. The lower degrees may be carried down as low as may be necessary for the cold of any particular climate. The mercurial thermometer need not be graduated lower than 40° below 0, because at about that degree mercury ceases to be fluid. The spirit thermometer may be graduated lower, if necessary.

Thermometers used for observation, must be situated in the open air out of the house, and at the distance of a foot (at least) from the wall, and where the light of the sun may not fall directly upon them. For chemical purposes, the bulbs and part of the tubes of the thermometers should project some way below the scales, that they may be dipped in liquids, mixtures, &c. For other purposes, as for botanical observations, hot-houses, brewing manufactories, baths, &c. the thermometers must be made longer or shorter, or narrower; and particular directions may be given with regard to the scales and other appendages.

Great inconvenience has attended the use of various kinds of thermometers with different graduations. Kirwan proposed to lay all these aside, and to construct a general one, beginning at the congelation of mercury, and terminating at the boiling of water, and divided into 250°. Mr. Murray of Edinburgh has since suggested, that it would be convenient to form a scale whose extreme points should be the temperatures of freezing and boiling mercury, both of which are now capable of being accurately ascertained, and to divide this scale into 1000°.

**THERMOMETER.**

<table>
<thead>
<tr>
<th>Deg.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0°</td>
<td>Heat of dry air</td>
</tr>
<tr>
<td>100°</td>
<td>Heat of human skin</td>
</tr>
<tr>
<td>212°</td>
<td>Heat of boiling water</td>
</tr>
<tr>
<td>34°</td>
<td>Heat between water boiling and wax melting</td>
</tr>
<tr>
<td>0°</td>
<td>Artificial congelation of water</td>
</tr>
<tr>
<td>1709</td>
<td>Lower than (0) greatest cold at Paris, in 1799</td>
</tr>
</tbody>
</table>

**Observations by Fahrenheit’s Thermometer.**

<table>
<thead>
<tr>
<th>From 103° to 106°</th>
<th>Heat of skin in dogs, cats, sheep, oxen, swine, and other quadrupeds</th>
</tr>
</thead>
<tbody>
<tr>
<td>From 99° to 102°</td>
<td>Heat of the human skin in health</td>
</tr>
<tr>
<td>97°</td>
<td>Heat of a swarm of bees</td>
</tr>
<tr>
<td>96°</td>
<td>A perch died in three minutes, in water so heated</td>
</tr>
<tr>
<td>90°</td>
<td>Heat of the air in the shade, in very hot weather</td>
</tr>
<tr>
<td>74°</td>
<td>Butter begins to melt</td>
</tr>
<tr>
<td>64°</td>
<td>Heat of the air in the shade, in warm weather</td>
</tr>
<tr>
<td>48°</td>
<td>Temperate air, in England and Holland</td>
</tr>
<tr>
<td>43°</td>
<td>Oil of olive begins to thicken and grow opaque</td>
</tr>
<tr>
<td>32°</td>
<td>Water just freezing, or snow and ice just thawing</td>
</tr>
<tr>
<td>39°</td>
<td>Milk freezes</td>
</tr>
<tr>
<td>28°</td>
<td>Urine and common vinegar freezes</td>
</tr>
<tr>
<td>21°</td>
<td>Blood out of the body freezes</td>
</tr>
<tr>
<td>20°</td>
<td>One part of spirit of wine mixed with three parts water freezes</td>
</tr>
<tr>
<td>17°</td>
<td>Greatest cold in Pennsylvania in 1731-2, 40° lat</td>
</tr>
<tr>
<td>16°</td>
<td>Greatest cold at Utrecht, in 1728-9</td>
</tr>
<tr>
<td>14°</td>
<td>A mixture of snow and salt, which is able to freeze oil of tartar per deliquium, but not brandy</td>
</tr>
<tr>
<td>9°</td>
<td>Great heat of the sun</td>
</tr>
</tbody>
</table>

Martine’s Essays, p. 284, &c.

We must here observe, that the heat of a hen hatching chickens is placed, by this table, at 108° of Fahrenheit’s thermometer; but it appears from M. Reaumur’s experiments, that eggs will hatch in a heat no greater than that of the human skin. See Hatching.

**Observations by Reaumur’s Thermometer.**

| 97° | Answers to the heat of boiling water |
| 80° | Spirit of wine in Reaumur’s thermometer boils |
| 29° | Greatest height of the air in the shade, observed at Paris in 1786, 1797, 1774 |
| 10° | Conjectural height of the caves of the observatory at Paris |
| 0°  | Artificial congelation of water |
| 14° | Lower than (0) greatest cold at Paris, in 1799 |

**Observations by Isaac Newton’s Thermometer.**

| 34° | Water boils vehemently |
| 28° | Water heats between water boiling and wax melting |
| 24° | Heat of water on which floating wax melts |
| 20° | Heat of water on which floating melted wax begins, by cooling, to lose its fluidity and transparence |
| 17° | Heat of a bath supportable to the hand at rest |
| 14° | The heat of blood just let out is almost the same |
| 12° | The heat of a bird hatching her eggs much the same |

**Observations by Fahrenheit’s Thermometer.**

| At 62° | Mercury boils |
| 54° | Oil of vitriol boils |
| 24° | Spirit of nitre boils |
| 13° | Lixivium tartari boils |
| 12° | Cow’s milk boils |
| 6°  | Water boils |
| 8°  | Fresh human urine boils |
| 9°  | Brandy boils |
| 14° | Alcohol boils |
| 176| According to Muffchenbreeck, the thermometer being at 29 Rhineland inches |
| 156| Serum of blood and white of eggs hardens |
| 146| Killing heat for animals, in a few minutes |
| 108| A hen hatching eggs, but seldom so hot |
| 107°| Heat of skin in ducks, geese, hens, pigeons, and partridges and swallows |
| 106°| Heat of skin in a common age and fever |

**Observations by Reaumur’s Thermometer.**

| At 17° | Heat of hatching eggs, but seldom so hot |
| 14° | The heat of blood just let out is almost the same |
| 12° | The heat of a bird hatching her eggs much the same |

**Observations by Isaac Newton’s Thermometer.**

| 24° | Heat of water on which floating wax melts |
| 20° | Heat of water on which floating melted wax begins, by cooling, to lose its fluidity and transparence |
| 17° | Heat of a bath supportable to the hand at rest |
| 14° | The heat of blood just let out is almost the same |
| 12° | The heat of a bird hatching her eggs much the same |
THERMOMETER.

Dec.
6 { Heats of the air in summer.
5
4
3
2
1
Water begins to freeze.


4. Observations by Dr. Hales's Thermometer.

146} Anwers to the heat of boiling water.
100 { Heat of water on which floating wax begins to melt.
88 Scorching heat in 1727.
85 Scorching heat of a hot-bed of horse-dung, and also the heat of blood in high fevers.
64 Heat of the blood of animals; whence the heat of the blood to that of boiling water is as 14.27 to 33.
58 Heat of urine.
56 Due healthy heat of a hot-bed of horse-dung in February, that of the open air being 17°, and nearly the bottom heat, and heat for hatching of eggs.
55 Heat of milk from the cow.
54 External heat of the body.
50 Common noon heat in the sun in July.
38 Mean heat of the air in the shade in July.

From 30 to 17

May and June heat; and the molt genial heat for molt plants, in which they flourish and grow molt.

From 20 to 10

Autumnal and vernal heat.

From freezing point to 10

Winter heat.

18 Temperate point.
31 The molt kindly heat for melon-thistle.
ananas or pine-apple.
pimento.
euphorbiurn.
cerus.
alo.
Indian fig.
ficoide.
orange.
myrtle.

0 Fresh water just freezing.

Hales's Stational Eff. vol. i. p. 58, &c.

For other similar observations, see Freezing Mixtures, and Heat.


THERMOMETERS for particular Uses. In 1757, the right hon. the earl of Cavendish presented to the Royal Society an account of a curious construction of thermometers, of two different forms; one contrived to shew the greatest de-

gree of heat, and the other the greatest cold; that may happen at any time in a person's abstinence. The first consists of a cylinder of glass joined to a tube, and differs from the common form only in having the top of the tube drawn out into a capillary tube, which enters into a glass ball C (Plate XVI. Physic, fig. 11.) joined on to the tube at the place where it begins to be contracted. The cylinder, and part of the tube, are filled with mercury, the top of which shews the common degrees of heat as usual. The upper part of the tube above the mercury is filled with spirit of wine, and some of the same liquor is left in the ball C, so as to fill it almost to the top of the capillary tube.

When the thermometer rises, the spirit of wine will be driven out of the tube, and will fall into the ball C. When the thermometer sinks again, as the spirit cannot be returned back from the ball, the top of the tube will remain empty, and the length of the empty part will be proportional to the fall of the thermometer. Consequently, by means of a proper scale, the top of the spirit of wine will shew how many degrees it has been higher than when observed, which being added to the present height, will give the greatest degree of heat it has been at. To fit this thermometer for a new observation, it is necessary to fill the upper part of the tube with spirits, by inclining the instrument till the spirits in the ball C cover the end of the capillary tube; for if the cylinder is then heated, by applying the hand to it, or by the flame of a lamp held at some distance, the spirits rise to the top of the tube, and run over into the ball C, and is then suffered to cool in the same position, the tube will remain full of spirits, and the thermometer will be fitted for a new experiment.

The scale of degrees at top, which shews the descent of the thermometer from the highest point it has arrived at, ought not, in strictness, to be the same at all times of the year; for these degrees exceed the common degrees of heat pointed out by the top of the mercury, as much as the column of spirit of wine expands, and therefore are greatest when that column is fo; i.e. when the greatest heat to which the instrument has been exposed is leaf. A difference of 30 degrees of Fahrenheit's scale, in the greatest rise of the thermometer, would require the scale to be altered one sixtieth part; and the error arising from making use of the same scale, will be about one-sixth of a degree, if the thermometer is observed when it has fallen ten degrees.

In the thermometer here described, the bore of the tube is about 0.027 inches; and one inch of it contains two grains of mercury, and answers to about ten degrees, the cylinder containing about 2280 grains. When the scale of degrees is large, the cylinder must be of considerable size. The quicksilver in the ball C serves to supply the tube, in case any of it should be driven into the ball by the thermometer's being exposed to too great a heat.

If the weight of the mercury be thought inconvenient, it may be avoided by the construction in fig. 12. where the bottom of the tube is bent fo as to point upwards, and is joined to a ball A, which communicates with a cylinder placed above it. It is in all other respects the same as the former instrument. It is filled with spirits of wine and mercury; the quantity of the latter being sufficient to fill the whole tube and the ball A.

The thermometer for shewing the greatest degree of cold that happens in any place during the time the instrument is left in it, is represented in fig. 13. The tube is bent into the shape of a tiphon, of unequal legs, standing parallel to one another; the top of the shorter leg is bent to a right angle, and opens into a ball A, which, by means of a short bent tube on the opposite side, communicates with a cylin-

3 T 2
THERMOMETER.

uder standing parallel to the legs of the fiphon, and point- ing downwards. This cylinder contains the greatest part of the fluid, and is added only to make the thermometer more fin- enible than it would be, if the ball A were made of a suf- cient size to contain the proper quantity of fluid. This instrum- ent is filled with spirit of wine, with the addition of as much mercury as is sufficient to fill both legs of the fiphon, and about a fourth or fifth part of the ball A. The common degrees of heat are shown by the top of the mer- cury in the longest leg, or by the top of the spirit, in cafes any of it is left above the mercury. When the mercury in the longest leg sinks by cold, that in the shorter leg will rise, and will run over into the ball A; from whence it cannot return back when the thermometer rises again, as the surface of the mercury in the ball is below the orifice of the tube n. Therefore the upper part of the shorter leg will be filled with a column of spirits of a length proportional to the increase of heat; the bottom of which, by means of a proper scale, will shew how much the thermometer has been lower than it is; which being subtracted from the present height, will give the lowest point that it has been at. In order to prevent the mercury from falling into the ball A in large drops, which would affect the accuracy of the instru- ment, the top of the shorter leg, close to the ball, is con- tracted, by being held in the flame of a lamp, and the pad- fage farther slighltened by a solid thread of glass placed within the tube, and extending from the bottom of the shorter leg to the part near the ball A, where it is most con- tracted. By this means, as soon as any small portion of mercury is got beyond the thread of glass, it breaks off, and falls into the ball in very small drops.

In order to fill the shorter leg with mercury, for a new experiment, it must be inclined till the mercury in the ball covers the orifice of the tube n. The cylinder being then heated, the mercury will be forced into the shorter leg, and will run down the thread of glass in drops, which will soon unite. To such a quantity of mercury must be got into the shorter leg, as, upon the cooling of the instrument, will be sufficient to drive all the spirit of wine into the ball, with a legs degree of cold than what the thermometer is likely to be exposed to. The ball A must always have some mercury in it, but never enough to fill it up to the orifice of the tube n. It will be best to have a little of the spirit above the mercury in the longest leg; in which case the top of the spirit will shew the common degrees of heat. The scale of degrees on the shorter leg will, in different seasons, be liable to an error similar to that which was explained in the first mentioned thermometer; but it will be less considerable, as the space between the two scales is filled with mercury, whose expansion is about six times less than that of the spirit of wine. In the thermometer now described, the bore of the tube is about .054 inches; and one inch of it contains eight grains of mercury, and answers to seven degrees of Fahrenheit's scale. The drops of mercury which fall into the ball A, answer to about one-eighth of a degree.

Instruments of this kind, with some alteration in their con- struction, would serve for finding the temperature of the sea at great depths, and also for finding that of the air at consider- able heights. Lord Charles Cavendish has shewn how to adapt them for such purposes. See Phil. Trans. vol. l. art. 38. p. 500, &c.

Since the publication of Mr. Canton's discovery of the comprcnsibility (see COMPRESSION) of spirits of wine and other fluids, there are two corrections necessary to be made in the refract given by lord Charles Cavendish's thermometer. For in estimating, e. g. the temperature of the sea at any depth, the thermometer will appear to have been colder than it really was; and besides, the expansion of spirits of wine by any given number of degrees of Fahrenheit's thermometer is greater in the higher degrees than in the lower. For the method of making these two corrections by Mr. Caven- dish, see Phipps's Voyage to the North Pole, p. 145.

Instruments of this kind, for determining the degree of heat or cold in the absence of the observer, have been in- vented and described by others. Van Swinden (Diff. fur la Comparifun du Therm. p. 255—255.) describes one, which, he says, was the first of the kind made on a plan communica- ted by M. Bernoulli to M. Leibnitz. M. Kraft, he also tells us, made one nearly like it. Mr. Six, in 1782, pro- posed another construction of a thermometer of the fame kind, which has been well received.

This is properly a spirit thermometer, though mercury is employed in it for the purpose of supporting a certain in- dext: a b (fig. 14.) is a tube of thin glafs, about sixteen inches long, and 4/ths of an inch in diameter; cdefgh is a smaller tube, with the inner diameter about 2/ths, joined to a larger at the upper end b, and bent down fift on the left side, and then, after defending two inches below a b, upwards again on the right, in the several directions e a, f g h, parallel to, and one inch diant from it. At the end of the fame tube at b, the inner diameter is enlarged to half an inch from b to f, which is two inches in length. This glafs is filled with highly rectifed spirit of wine to within half an inch of the end f, excepting that part of the small tube from d to g, which is filled with mercury. From a view of the instrument it will be readily conceived, that when the spirit in the large tube is expanded by heat, the mercury in the small tube on the left side will be prefled down, and caufe that on the right side to rife: on the contrary, when the spirit is condenfed by cold, the reverse will happen. Fahrenheit's scale, which begins with c at the top of the left side, has the degrees numbered downwards, while that at the right side, beginning with c at the bottom, ascend. The divisions are acertained by placing the thermometer with a good standard mercurial one in water, gradually heat- ing or cooling, and marking the divisions of the new scale at every five degrees. The divisions below the freezing point are taken by means of a mixture of sea-falt and ice, as de- scribed by Nollet, De Luc, and others. In order to shew how high the mercury has rifen in the obferver's absence, there is placed within the small tube of the thermometer, above the surface of the mercury on either side, immerfed in the spirit of wine, a small index, fo fitted as to pafs up and down as occasion may require. One of these indices is re- presented in fig. 15; a is a small glafs tube, three-quarters of an inch long, hermetically sealed at each end, inclufing a piece of fleg wine nearly of the fame length; at each end e, d, is fited a fhort piece of a tube of black glafs, of fuch a diameter as to pafs freely up and down within the small tube of the thermometer. The lower end, floating on the surface of the mercury, is carried up with it when it rifes, while the piece at the upper end, being of the fame diame- ter, keeps the body of the index parallel to the fides of the thermometrical tube. From the upper end of the body of the index at c is drawn a spring of glafs to the fides of a hair, about five-fourths of an inch in length, which being let a little oblique, palls lightly against the surface of the tube, and prevents the index from following the mercury when it defends, or being moved by the fpirit palling up and down, or by any fudden motion given to the instru- ment ; but at the fame time the prefure is fo adjusted as to permit this index to be readily carried up by the surface of the rifing mercury, and downwards, whenever the instru- ment is retificed for observation. This index, by not re-
turning with the mercury when it descends, flows distinctly
and accurately how high the mercury has risen, and con-
sequently what degree of cold or heat has happened. To
prevent the spirit from evaporating, the tube at the end is
closely sealed. The daily rectification of this instrument is
performed, by applying a small magnet to that part of the
tube against which the index rests; by the action of which
the included piece of steel wire, and consequently the index,
is easily brought down to the surface of the mercury. When
this has been done, the instrument is rectified for the next
day’s observation, without heating, cooling, separating, or
at all disturbing the mercury, or moving the instrument.
With a thermometer of this sort, Mr. Six observed the
greatest heat and cold that happened every day and night
throughout the year 1781. But for the more particular de-
scription of this instrument, the illustration of it by figures,
and an account of its advantages, the limits of this work
require our referring to Phil. Trans. vol. lxxii. part i.

A similar effect to that produced by Six’s thermometer is
obtained in Rutherford’s arrangement of a pair of ther-

mometers, one with mercury, the other with spirit of wine,
placed in a horizontal position; one index being without
the surface of the mercury, the other within that of the
spirit, the thermometers being in contrary directions, both indices
may be brought back to their places, by merely raising the
end of the instrument. (See fig. 16.) Self-registering ther-
mometers have also sometimes been constructed for keeping a
still more accurate account of all the variations of tempera-
ture that have occurred, by describing a line on a revolving
barrel, which flew the height for every instant during the
whole time of their operation.

M. de Luc has described the best method of construct-
ing a thermometer, fit for determining the temperature of the
air, in the menuration of heights by the barometer. He
has also shewn how to divide the scale of a thermometer,
so as to adapt it for astronomical purposes in the observa-
tion of refraction. See Récherches, &c. tom. ii. p. 35, &c.
p. 265, &c.

Mr. Cavallo, in 1781, proposed the construction of a
thermometrical barometer, which, by means of boiling water,
might indicate the various gravity of the atmosphere, or the
height of the barometer. This thermometer, he says, with
its apparatus, might be packed up into a small portable box,
and serve for determining the heights of mountains, &c. with
greater facility than with the common portable barometer.
The instrument, in its present state, consists of a cylindrical
vessel, about two inches in diameter, and five inches high,
in which vessel the water is contained, which may be made
to boil by the flame of a large wax-candle. The ther-
mometer is fastened to the vessel in such a manner, as that
its bulb may be about one inch above the bottom. The
scale of this thermometer, which is of brass, exhibits on one
side of the glass tube a few degrees of Fahrenheit’s scale,
vis. from 200° to 216°. On the other side of the tube are
marked the various barometrical heights, at which the boil-
ing water flew those particular degrees of heat which are
set down in Sir G. Shuckburgh’s table. With this instru-
ment the barometrical height is shewn within one-tenth of an
inch. The degrees of this thermometer are somewhat
longer than one-tenth of an inch, and therefore may be
divided into many parts, especially by a Nonius. But the
greatest imperfection of the instrument arises from the small-
nesses of the vessel, which does not admit a sufficient
quantity of water; but when the quantity of water is
sufficiently large, e.g. 10 or 12 ounces, and is kept boiling
in a proper vessel, its degree of heat under the same pressure
of the atmosphere is very settled; whereas when a ther-

mometer is kept in a small quantity of boiling water, the
quicksilver in its stem does not stand very steady, sometimes
rising or falling even half a degree. Mr. Cavallo proposes
a farther improvement of this instrument in the Phil. Trans.
vol. lxxi. part ii. p. 524.

The ingenious Mr. Wedgwood, so well known for his
various improvements in the different sorts of pottery-ware,
has contrived to make a thermometer for measuring the
higher degrees of heat, by means of a distinguishing property
of argillaceous bodies, viz. the diminution of their bulk by
fire. This diminution commences in a low red heat, and
proceeds regularly, as the heat increases, till the clay be-
comes vitrified. The total contraction of some good clays
which he has examined in the forge of his own fires, is
considerably more than one-fourth in every dimension.
If, therefore, we can procure at all times a clay sufficiently
apprising and unvitrefcible, and always of the same quality in
regard to contraction by heat; and if we can find means of
measuring this contraction with ease and accuracy, we shall
be furnished with a measure of fire sufficient for every pur-
purpose of experiment or business. Some of the purest Cornish
porcelain clays (which, by the analysis of Mr. Wedgwood,
appear to contain no calcareous earth nor gypseous matter,
but to consist of pure argillaceous or alum earth, and
another indissoluble earth, which he apprehends to be of the
siliceous kind, in the proportion of three parts of the former
to two parts of the latter) seem the best adapted, both for
supporting the intensity, and measuring the degrees of fire.
This material is prepared for use by washing it over, and
whiff in a dilated plate passing it through a fine lawn: it is
then dried and put up in boxes. The dry clay is to be
softened for use with about two-fifths its weight of water;
and formed into small pieces, in little moulds of metal, \\
\textit{\textfrac{1}{6}ths} of an inch broad, with the sides exactly parallel; about
\textit{\textfrac{1}{6}ths} of an inch deep, and an inch long. The moulds are
to be oiled and warmed. These pieces, when perfectly dry,
are put into another iron mould or gage, confining only of
a bottom, with two sides, \textit{\textfrac{1}{6}ths} of an inch deep, to the
dimensions of which sides the breadth of the pieces is to be
poured down. For measuring the diminution which they are
to suffer from the action of fire, another gage is made of two
pieces of brass, twenty-four inches long, with the sides
exactly straight, divided into inches and tenths, fixed five-
tenths of an inch aunder at one end, and three-tenths at the
other, upon a brass plate; so that one of the thermometric
pieces, when poured down in the iron gage, will just fit to
the wider end. If this piece be supposed to have diminished in
the fire one-fifth of its bulk, it will then pass on to half the
length of the gage: if diminished two-fifths, it will go on to
the narrowest end; and in any intermediate degree of con-
traction, if the piece be slid along till it rests against the
converging sides, the degree at which it stops will be the
measure of its contraction, and consequently of the degree of
heat it has undergone. The thermometric pieces may be
formed much more expeditiously than in the single mould
by means of an instrument, consisting of a cylindrical iron
vessel, with holes in the bottom, of the form and dimensions
required.—The soft clay, put in the vessel, is forced by a
press down through these apertures, in long rods, which
may be cut while moist, or broken when dry, into pieces of
convenient lengths. After which, recourse should be had
to the proper gage for ascertaining and adjusting their breadth
when perfectly dry.

Each division of the scale, though so large as a tenth of
When Sulphuric acid stands 14° to 33° differential fill the tank, and the little piece of clay. When one gage is accurately adjusted to the proportional measures above stated, two pieces of brass should be made, one fitting exactly into one end, and the other into the other, which will serve as standards for the ready adjustment of other gauges to the dimensions of the original, and thus we may be assured, that thermometers on this principle, though made by different persons, and in different countries, will all be equally affected by equal degrees of heat, and all speak the same language. The scale commences at a red heat fully visible in day light; and the greatest heat which Mr. Wedgwood has hitherto obtained in his experiments, is 160°. Swedish copper has been found to melt at 27°, silver at 28°, and gold at 32°, of this thermometer. Brass is in fusion at 21°; the welding heat of iron is from 90° to 95°, and the greatest heat that could be produced in a common smith's forge, 135°. Call iron melted at 150°; and the heat by which iron is run down among the fuel for casting is 150°. A Hessian crucible melted into a flag-like subsance at about 150°. The founding heat of glafs furnaces, or that by which the perfect vitrifications of the materials is produced, was at one of them 114° for flint-glafls, and 124° for plate-glafls. Delft-ware is fired by a heat of 40° or 41°; Queen's-wafl by 56°; and flone-wafl by 102°, which degree of heat changes it to a true porcelain texture. The thermometer pieces begin to acquire a porcelain texture at about 110°. A piece of an Etruscan vase melted completely at 35°; pieces of other vase and Roman ware about 36°; Worceftcr china vitrified at 94°; Mr. Srimont's Chelfea china at 105°; the Derby at 112°; the Bow at 121°; but Brifol china fhewed no appearance of vitrification at 125°. The common fort of Chinefe porceflain does not perfectly vitrify by any fire which Mr. Wedgwood could produce; but began to fofen about 120°, and at 156° became fo soft as to fink down and apply itfelf clofe upon an irregular furface underneath. The true flone Nankeen does not fofen in the lead, by this strong heat; nor even acquire a porcelain texture. The Drefden porceflain is more common in the Chinefe, but not equally so with the flone Nankeen. The cream-coloured or Queen's-wafl bears the fame heat as the Drefden. Mr. Pott fays, that to melt a mixture of chalk and clay in certain proportions, which appear from his tables to be equal parts, is "among the matter-pieces of art." This mixture melts into a perfect glafs at 235° of this thermometer. For other curious particulars, fee Phil. Trans. vol. lxxii. part ii. p. 305, &c.

This thermometer, fays Dr. Young, (Lecl. on Nat. Philof. vol. i. 648.) may be extremely ufeful for identifying the degree of heat which is required for a particular purpofe; but for the comparison of temperatures by an ex- tension of the numerical fcale, we have not fufficient evidence of its accuracy to allow us to depend on its indications; and it is scarcely credible, that the operation of furnaces of any kind, can produce a heat of fo many thousand degrees of a natural fcale, as Mr. Wedgwood's experiments have led him to fuppofe; nor is the fuppofofion confident with the obfervations of other philofophers.

THERMOMETER. Differential, a curious fort of thermometer invented by profeffor Leffie, which exprifes not the abfolute degree of heat, but the difference, when any exifts, between the temperatures of the two flots where its two bulbs are placed. The method of constructing it is as follows. (See Plate XVI. Pneumatics, fig. 17.) Select two thermometer tubes with bores rather wider than usual, and one a little wider than the other. Let the balls be blown as equal as the eye can judge, and from .4 to .7 of an inch in diameter, and let the open end of the tube also be widened in a right angle. The tubes must be of unequal length, the longest being nearly twice the length of the other. Then introduce into the longer tube a little sulphuric acid tinged with carmine, sufficient to fill about an inch of its cavity; then join the two tubes together by the blow-pipe, and when joined, bend them in the form of the letter U, with the bulbs about three or four inches asunder, making one flexure just below the juncture of the two tubes, where the small cavity (which is represented in the plate) facilitates the adjustment of the instrument, which by a little dexterity is performed by forcing a few globules of air by the heat of the hand from one bulb to the other. Attach a graduated scale to the shorter tube, making the zero about the middle of it, and adjust to it the quantity of air in each bulb, so that when the bulbs are at the fame temperature, the upper surface of the coloured liquor may just correspond with the zero. Sulphuric acid is chosen as the liquor interpofed between the bulb, on account of its bearing any heat or cold that would be used without being evaporated or congealed.

In this instrument the air inclofed in the bulbs is the sub- stance, which, by its expansion or contraction, caufes the motion of the coloured liquor up or down the scale, and as gases are much more expanfible than liquids, the instrument is sooner affected by minute changes of heat. But as the two bulbs are of equal size, and both filled with air, and separated from each other by the intervening liquor, it is obvious that when the temperature is the fame in each bulb, be it high or low, the preflure on each fide of the liquor is also equal, and it muft remain flationary; fo that it can only move when one bulb is warmer than the other. Hence the particular and sole ufe of this instrument as a differential thermometer. The lower part of the instrument (or the space included between the two bends) is cemented to an upright stem, by which it is supported.

This instrument has been employed by the inventor in a variety of curious experiments on caloric, or the matter of heat. The peculiar advantage which this instrument poffefeis is, that, besides its extreme fensibility, in using it the common temperature of the surrounding air may, in general, be disregarded; this being always the zero of the fcale, whatever be the actual variation of heat in the surrounding atmosphere; and hence a much greater degree of fimplicity is introduced into the delicate researches on this subjedt. For the reflection of heat mirrors were employed, generally of block-tiln, highly polished, and hammered to fit a wooden gage, the segment of a parabolic curve, by which much of the defipofion produced by a simple concave form was avoided; fo that when expofed to the direft rays of the sun, they collected them into a pretty difinft focus, of about half an inch in diameter. The subfance employed to generate the radiant heat was a hollow cubic tin cafleril, placed directly in front of the mirror of its focal point, and when used, filled with boiling water, and fitted with a common thermometer, paffing through a hole in the cover, and immerfed in the water. The cubical form of the cafleril allowed of four fides, of perfectly equal dimensions, each of which, when turned to the mirror, afforded a heated surface for the transmission of radiant caloric, and they were occasionally coated with various subftances to acertein the efleet of colour, polifh, and the like, in re- garding or promoting the radiation of the heat within. With this apparatus, and his differential thermometer, Mr. Leffie performed a variety of interefling experiments, for
for the general results of which we refer to the article on
Heat; and for a more minute detail to Lefèvres “In-
quiry into the Nature of Heat,” and for an extensive
abstract, to an elaborate article on Caloric in Aikins’s
Dictionary. See also our articles Caloric, Radiant Heat,
&c. &c.

**Thermometer, Balance.** An instrument invented by Mr.
James Kewley, of the Isle of Man, and for which he ob-
tained a patent for Scotland, dated Nov. 6, 1816; for Eng-
land, dated Nov. 21, 1816; and for Ireland, dated Jan. 4,
1817. This instrument (besides answering the purpose of
measuring the quantity of heat,) was used as a first moving
power for putting machinery into motion, for the purpose of
regulating the temperature, by opening or closing the flues,
windows, or doors of the apartment in which it is placed.
This instrument must therefore be of great importance to the
horticulturist; as by it the artificial climate of hot-houses,
conservatories, hot-beds, &c. can be accurately regulated,
without the least attention from the gardener, farther
than occasionally to wind up the machine to which it is
attached.

In Plate XVI. Pneumatics, fig. 18, is a perspective represen-
tation of Kewley’s balance thermometer. A is a glass tube,
with its bulbs ε and δ hermetically sealed at ε, and having
a very fine aperture at η, for the admission of the pressure
of the atmosphere upon the surface of the quicksilver con-
tained in the bulb δ; ε is a milled nut, let into a mortise
in the frame θ, having a female screw in its centre, throu-
gh which the screw i is made to pass. This nut serves to

---

**Comparisons of different Thermometers.**

**Table for Reaumur’s Thermometer.**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
<td>100</td>
<td>212</td>
<td>51</td>
<td>63.75</td>
<td>146.75</td>
<td>22</td>
<td>28.75</td>
<td>93.75</td>
<td>6</td>
<td>6.25</td>
<td>20.75</td>
</tr>
<tr>
<td>79</td>
<td>98.75</td>
<td>209.75</td>
<td>50</td>
<td>62.5</td>
<td>144.5</td>
<td>21</td>
<td>27.5</td>
<td>81.5</td>
<td>7</td>
<td>7.5</td>
<td>18.5</td>
</tr>
<tr>
<td>78</td>
<td>97.5</td>
<td>207.5</td>
<td>49</td>
<td>61.25</td>
<td>142.25</td>
<td>20</td>
<td>26.25</td>
<td>79.25</td>
<td>6</td>
<td>6.25</td>
<td>16.25</td>
</tr>
<tr>
<td>77</td>
<td>96.25</td>
<td>205.25</td>
<td>48</td>
<td>60</td>
<td>140</td>
<td>19</td>
<td>25</td>
<td>77</td>
<td>8</td>
<td>8.75</td>
<td>14.75</td>
</tr>
<tr>
<td>76</td>
<td>95</td>
<td>203</td>
<td>47</td>
<td>58.75</td>
<td>137.75</td>
<td>18</td>
<td>23.75</td>
<td>74.75</td>
<td>7</td>
<td>7.5</td>
<td>12.75</td>
</tr>
<tr>
<td>75</td>
<td>93.75</td>
<td>200.75</td>
<td>46</td>
<td>57.5</td>
<td>135.5</td>
<td>17</td>
<td>22.5</td>
<td>72.5</td>
<td>6</td>
<td>6.25</td>
<td>10.75</td>
</tr>
<tr>
<td>74</td>
<td>92.5</td>
<td>198.5</td>
<td>45</td>
<td>56.25</td>
<td>133.25</td>
<td>16</td>
<td>21</td>
<td>70.25</td>
<td>5</td>
<td>5.75</td>
<td>8.75</td>
</tr>
<tr>
<td>73</td>
<td>91.25</td>
<td>196.25</td>
<td>44</td>
<td>55</td>
<td>131</td>
<td>15</td>
<td>19.75</td>
<td>67.75</td>
<td>4</td>
<td>4.75</td>
<td>6.75</td>
</tr>
<tr>
<td>72</td>
<td>90</td>
<td>194</td>
<td>43</td>
<td>53.75</td>
<td>128.75</td>
<td>14</td>
<td>18.75</td>
<td>65.75</td>
<td>3</td>
<td>3.75</td>
<td>5.75</td>
</tr>
<tr>
<td>71</td>
<td>88.75</td>
<td>191.75</td>
<td>42</td>
<td>52.5</td>
<td>126.5</td>
<td>13</td>
<td>17.5</td>
<td>63.5</td>
<td>2</td>
<td>2.75</td>
<td>4.75</td>
</tr>
<tr>
<td>70</td>
<td>87.5</td>
<td>189.5</td>
<td>41</td>
<td>51.25</td>
<td>124.25</td>
<td>12</td>
<td>16.25</td>
<td>61.25</td>
<td>1</td>
<td>1.75</td>
<td>3.75</td>
</tr>
<tr>
<td>69</td>
<td>86.25</td>
<td>187.25</td>
<td>40</td>
<td>50</td>
<td>122</td>
<td>11</td>
<td>15</td>
<td>59</td>
<td>10</td>
<td>10</td>
<td>2.75</td>
</tr>
<tr>
<td>68</td>
<td>85</td>
<td>185</td>
<td>39</td>
<td>48.75</td>
<td>119.75</td>
<td>10</td>
<td>13.75</td>
<td>56.75</td>
<td>9</td>
<td>9.25</td>
<td>1.75</td>
</tr>
<tr>
<td>67</td>
<td>83.75</td>
<td>182.75</td>
<td>38</td>
<td>47.5</td>
<td>117.5</td>
<td>9</td>
<td>12.5</td>
<td>54.25</td>
<td>8</td>
<td>8.25</td>
<td>0.75</td>
</tr>
<tr>
<td>66</td>
<td>82.5</td>
<td>180.5</td>
<td>37</td>
<td>46.25</td>
<td>115.25</td>
<td>8</td>
<td>11</td>
<td>52.25</td>
<td>7</td>
<td>7.25</td>
<td>0.75</td>
</tr>
<tr>
<td>65</td>
<td>81.25</td>
<td>178.25</td>
<td>36</td>
<td>45</td>
<td>113</td>
<td>7</td>
<td>10</td>
<td>50</td>
<td>6</td>
<td>6.25</td>
<td>0.25</td>
</tr>
<tr>
<td>64</td>
<td>80</td>
<td>176</td>
<td>35</td>
<td>43.75</td>
<td>110.75</td>
<td>6</td>
<td>9</td>
<td>47.75</td>
<td>5</td>
<td>5.75</td>
<td>0.25</td>
</tr>
<tr>
<td>63</td>
<td>78.75</td>
<td>173.75</td>
<td>34</td>
<td>42.5</td>
<td>108.5</td>
<td>5</td>
<td>8</td>
<td>45.75</td>
<td>4</td>
<td>4.75</td>
<td>0.25</td>
</tr>
<tr>
<td>62</td>
<td>77.5</td>
<td>171.5</td>
<td>33</td>
<td>41.25</td>
<td>106.25</td>
<td>4</td>
<td>7</td>
<td>43.75</td>
<td>3</td>
<td>3.75</td>
<td>0.25</td>
</tr>
<tr>
<td>61</td>
<td>76.25</td>
<td>169.25</td>
<td>32</td>
<td>40</td>
<td>104</td>
<td>3</td>
<td>6</td>
<td>41.75</td>
<td>2</td>
<td>2.75</td>
<td>0.25</td>
</tr>
<tr>
<td>60</td>
<td>75</td>
<td>167</td>
<td>31</td>
<td>38.75</td>
<td>101.75</td>
<td>2</td>
<td>5</td>
<td>39.75</td>
<td>1.25</td>
<td>1.75</td>
<td>0.25</td>
</tr>
<tr>
<td>59</td>
<td>73.75</td>
<td>164.75</td>
<td>30</td>
<td>37.5</td>
<td>99.5</td>
<td>1</td>
<td>1</td>
<td>37.75</td>
<td>1</td>
<td>1.25</td>
<td>0.25</td>
</tr>
<tr>
<td>58</td>
<td>72.5</td>
<td>162.5</td>
<td>29</td>
<td>36.25</td>
<td>97.25</td>
<td>0.5</td>
<td>1</td>
<td>35.75</td>
<td>0.75</td>
<td>0.75</td>
<td>0.25</td>
</tr>
<tr>
<td>57</td>
<td>71.25</td>
<td>160.25</td>
<td>28</td>
<td>35</td>
<td>95</td>
<td>0</td>
<td>1</td>
<td>33.75</td>
<td>0.25</td>
<td>0.25</td>
<td>0.25</td>
</tr>
<tr>
<td>56</td>
<td>70</td>
<td>158</td>
<td>27</td>
<td>33.75</td>
<td>92.75</td>
<td>-1.25</td>
<td>-1</td>
<td>30.75</td>
<td>0.25</td>
<td>0.25</td>
<td>0.25</td>
</tr>
<tr>
<td>55</td>
<td>68.75</td>
<td>155.75</td>
<td>26</td>
<td>32.5</td>
<td>90.5</td>
<td>-2.5</td>
<td>-2</td>
<td>27.75</td>
<td>0.25</td>
<td>0.25</td>
<td>0.25</td>
</tr>
<tr>
<td>54</td>
<td>67.5</td>
<td>153.5</td>
<td>25</td>
<td>31.25</td>
<td>88.25</td>
<td>-3.75</td>
<td>-3</td>
<td>24.75</td>
<td>0.25</td>
<td>0.25</td>
<td>0.25</td>
</tr>
<tr>
<td>53</td>
<td>66.25</td>
<td>151.25</td>
<td>24</td>
<td>30</td>
<td>86</td>
<td>-5</td>
<td>-5</td>
<td>21.75</td>
<td>0.25</td>
<td>0.25</td>
<td>0.25</td>
</tr>
<tr>
<td>52</td>
<td>65</td>
<td>149</td>
<td>23</td>
<td>28.75</td>
<td>83.75</td>
<td>-7</td>
<td>-7</td>
<td>18.75</td>
<td>0.25</td>
<td>0.25</td>
<td>0.25</td>
</tr>
</tbody>
</table>
### THERMOMETER.

**Table for Fahrenheit’s Thermometer.**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>212</td>
<td>80.00</td>
<td>100.00</td>
</tr>
<tr>
<td>211</td>
<td>79.55</td>
<td>99.44</td>
</tr>
<tr>
<td>210</td>
<td>79.11</td>
<td>98.88</td>
</tr>
<tr>
<td>209</td>
<td>78.66</td>
<td>98.33</td>
</tr>
<tr>
<td>208</td>
<td>78.22</td>
<td>97.77</td>
</tr>
<tr>
<td>207</td>
<td>77.77</td>
<td>97.22</td>
</tr>
<tr>
<td>206</td>
<td>77.33</td>
<td>96.66</td>
</tr>
<tr>
<td>205</td>
<td>76.88</td>
<td>96.11</td>
</tr>
<tr>
<td>204</td>
<td>76.44</td>
<td>95.55</td>
</tr>
<tr>
<td>203</td>
<td>76.00</td>
<td>95.00</td>
</tr>
<tr>
<td>202</td>
<td>75.55</td>
<td>94.44</td>
</tr>
<tr>
<td>201</td>
<td>75.11</td>
<td>93.88</td>
</tr>
<tr>
<td>200</td>
<td>74.66</td>
<td>93.33</td>
</tr>
<tr>
<td>199</td>
<td>74.22</td>
<td>92.77</td>
</tr>
<tr>
<td>198</td>
<td>73.77</td>
<td>92.22</td>
</tr>
<tr>
<td>197</td>
<td>73.33</td>
<td>91.66</td>
</tr>
<tr>
<td>196</td>
<td>72.88</td>
<td>91.11</td>
</tr>
<tr>
<td>195</td>
<td>72.44</td>
<td>90.55</td>
</tr>
<tr>
<td>194</td>
<td>72.00</td>
<td>90.00</td>
</tr>
<tr>
<td>193</td>
<td>71.55</td>
<td>89.44</td>
</tr>
<tr>
<td>192</td>
<td>71.11</td>
<td>88.88</td>
</tr>
<tr>
<td>191</td>
<td>70.66</td>
<td>88.33</td>
</tr>
<tr>
<td>190</td>
<td>70.22</td>
<td>87.77</td>
</tr>
<tr>
<td>189</td>
<td>69.77</td>
<td>87.22</td>
</tr>
<tr>
<td>188</td>
<td>69.33</td>
<td>86.66</td>
</tr>
<tr>
<td>187</td>
<td>68.88</td>
<td>86.11</td>
</tr>
<tr>
<td>186</td>
<td>68.44</td>
<td>85.55</td>
</tr>
<tr>
<td>185</td>
<td>68.00</td>
<td>85.00</td>
</tr>
<tr>
<td>184</td>
<td>67.55</td>
<td>84.44</td>
</tr>
<tr>
<td>183</td>
<td>67.11</td>
<td>83.88</td>
</tr>
<tr>
<td>182</td>
<td>66.66</td>
<td>83.33</td>
</tr>
<tr>
<td>181</td>
<td>66.22</td>
<td>82.77</td>
</tr>
<tr>
<td>180</td>
<td>65.77</td>
<td>82.22</td>
</tr>
<tr>
<td>179</td>
<td>65.33</td>
<td>81.66</td>
</tr>
<tr>
<td>178</td>
<td>64.88</td>
<td>81.11</td>
</tr>
<tr>
<td>177</td>
<td>64.44</td>
<td>80.55</td>
</tr>
<tr>
<td>176</td>
<td>64.00</td>
<td>80.00</td>
</tr>
<tr>
<td>175</td>
<td>63.55</td>
<td>79.44</td>
</tr>
<tr>
<td>174</td>
<td>63.11</td>
<td>78.88</td>
</tr>
<tr>
<td>173</td>
<td>62.66</td>
<td>78.33</td>
</tr>
<tr>
<td>172</td>
<td>62.22</td>
<td>77.77</td>
</tr>
<tr>
<td>171</td>
<td>61.77</td>
<td>77.22</td>
</tr>
<tr>
<td>170</td>
<td>61.33</td>
<td>76.66</td>
</tr>
<tr>
<td>169</td>
<td>60.88</td>
<td>76.11</td>
</tr>
<tr>
<td>168</td>
<td>60.44</td>
<td>75.55</td>
</tr>
<tr>
<td>167</td>
<td>60.00</td>
<td>75.00</td>
</tr>
<tr>
<td>166</td>
<td>59.55</td>
<td>74.44</td>
</tr>
<tr>
<td>165</td>
<td>59.11</td>
<td>73.88</td>
</tr>
<tr>
<td>164</td>
<td>58.66</td>
<td>73.33</td>
</tr>
<tr>
<td>163</td>
<td>58.22</td>
<td>72.77</td>
</tr>
<tr>
<td>162</td>
<td>57.77</td>
<td>72.22</td>
</tr>
<tr>
<td>161</td>
<td>57.33</td>
<td>71.66</td>
</tr>
<tr>
<td>160</td>
<td>56.88</td>
<td>71.11</td>
</tr>
<tr>
<td>159</td>
<td>56.44</td>
<td>70.55</td>
</tr>
<tr>
<td>158</td>
<td>56.00</td>
<td>70.00</td>
</tr>
<tr>
<td>157</td>
<td>55.55</td>
<td>69.44</td>
</tr>
<tr>
<td>156</td>
<td>55.11</td>
<td>68.88</td>
</tr>
<tr>
<td>155</td>
<td>54.66</td>
<td>68.33</td>
</tr>
<tr>
<td>154</td>
<td>54.22</td>
<td>67.77</td>
</tr>
<tr>
<td>153</td>
<td>53.77</td>
<td>67.22</td>
</tr>
<tr>
<td>152</td>
<td>53.33</td>
<td>66.66</td>
</tr>
<tr>
<td>151</td>
<td>52.88</td>
<td>66.11</td>
</tr>
<tr>
<td>150</td>
<td>52.44</td>
<td>65.55</td>
</tr>
<tr>
<td>149</td>
<td>52.00</td>
<td>65.00</td>
</tr>
</tbody>
</table>
Table for the Centigrade Thermometer.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>70</td>
<td>5.6</td>
<td>40</td>
<td>16</td>
<td>5.9</td>
<td>30</td>
<td>20</td>
<td>4.2</td>
<td>20</td>
<td>15</td>
<td>4.2</td>
<td>10</td>
</tr>
<tr>
<td>71</td>
<td>6.4</td>
<td>45</td>
<td>17</td>
<td>7.6</td>
<td>35</td>
<td>18</td>
<td>8.4</td>
<td>25</td>
<td>18</td>
<td>9.2</td>
<td>20</td>
</tr>
<tr>
<td>72</td>
<td>7.2</td>
<td>50</td>
<td>18</td>
<td>9.4</td>
<td>35</td>
<td>20</td>
<td>10.2</td>
<td>25</td>
<td>20</td>
<td>11.2</td>
<td>20</td>
</tr>
<tr>
<td>73</td>
<td>8.0</td>
<td>55</td>
<td>19</td>
<td>11.4</td>
<td>40</td>
<td>22</td>
<td>12.2</td>
<td>30</td>
<td>22</td>
<td>13.2</td>
<td>25</td>
</tr>
<tr>
<td>74</td>
<td>8.8</td>
<td>60</td>
<td>20</td>
<td>13.6</td>
<td>45</td>
<td>24</td>
<td>14.2</td>
<td>35</td>
<td>24</td>
<td>15.2</td>
<td>25</td>
</tr>
<tr>
<td>75</td>
<td>9.6</td>
<td>65</td>
<td>21</td>
<td>15.8</td>
<td>50</td>
<td>26</td>
<td>16.2</td>
<td>40</td>
<td>26</td>
<td>17.2</td>
<td>25</td>
</tr>
<tr>
<td>76</td>
<td>10.4</td>
<td>70</td>
<td>22</td>
<td>18.0</td>
<td>55</td>
<td>28</td>
<td>18.2</td>
<td>45</td>
<td>28</td>
<td>19.2</td>
<td>25</td>
</tr>
<tr>
<td>77</td>
<td>11.2</td>
<td>75</td>
<td>23</td>
<td>20.8</td>
<td>60</td>
<td>30</td>
<td>20.2</td>
<td>50</td>
<td>30</td>
<td>21.2</td>
<td>25</td>
</tr>
<tr>
<td>78</td>
<td>12.0</td>
<td>80</td>
<td>24</td>
<td>22.8</td>
<td>65</td>
<td>32</td>
<td>22.2</td>
<td>55</td>
<td>32</td>
<td>23.2</td>
<td>25</td>
</tr>
<tr>
<td>79</td>
<td>12.8</td>
<td>85</td>
<td>25</td>
<td>24.8</td>
<td>70</td>
<td>34</td>
<td>24.2</td>
<td>60</td>
<td>34</td>
<td>25.2</td>
<td>25</td>
</tr>
<tr>
<td>80</td>
<td>13.6</td>
<td>90</td>
<td>26</td>
<td>26.8</td>
<td>75</td>
<td>36</td>
<td>26.2</td>
<td>65</td>
<td>36</td>
<td>27.2</td>
<td>25</td>
</tr>
<tr>
<td>81</td>
<td>14.4</td>
<td>95</td>
<td>27</td>
<td>28.8</td>
<td>80</td>
<td>38</td>
<td>28.2</td>
<td>70</td>
<td>38</td>
<td>29.2</td>
<td>25</td>
</tr>
<tr>
<td>82</td>
<td>15.2</td>
<td>100</td>
<td>28</td>
<td>30.8</td>
<td>85</td>
<td>40</td>
<td>30.2</td>
<td>75</td>
<td>40</td>
<td>31.2</td>
<td>25</td>
</tr>
</tbody>
</table>

**THERMOPOLIUM**, formed of *Stipa fruticosa*, and *Arundo*, a name for a fort of public houses among the ancients, in which hot liqueurs were sold, in the manner of our coffee-houses.

**THERMOPSIS**, in Botany, from *thermos*, a hot, and *opsis*, a view, *appearance* or *aspect*; indicating a general resemblance to that genus of plants.—Brown in Ait. Hort. Kew. v. 3. 3.

Linn. *Leguminosae*, Juss.

Ch. Calyx oblong, five-cleft half way down, two-lipped; convex behind; tapering at the base. Corolla papilionaceous; petals nearly of equal length; standard reflexed at the fides, keel obtuse. Stamens permanent. Legume compressed, linear, with many seeds. *Br.*

1. Th. lanceolata. Sharp-leaved Thermopsis. Ait. n. 1. (Podaaria lupinoides; Willd. Sp. Pl. v. 2. 504. Sophora lupinoides; Linn. Sp. Pl. 534. “Pallas Alfr. I. 119. t. 89.”) Leaflets oblong-lanceolate. Stipulas lanceolate, twice as long as the footstalks. Flowers whorled. Native of Siberia; from whence the late duke of Northumberland is said to have received it in 1776. This is a hardy perennial herbaceous plant, flowering in June and July. The stems are spreading or decumbent, about a foot long, branched in an alternate manner, round, hairy, leafy. Leaves ternate, light green, hairy, on short stalks; their leaflets about an inch long. Stipulas half as large, or more. Flowers stalked, about three in each whorl, yellow, much resembling those of a Lupine. Calyx hairy.

By Mr. Brown's specific character, we presume there are more species of this genus, though not in our gardens, of which he will one day give an account. For the foundness of the generic distinctions, we rely on them. The compressed legume teems the important difference between *Thermopsis* and the *Baptisia* of Ventenat and Brown; see Ait. Hort. Kew. v. 3. 5; also our articles *Sophora* and *Podaarya*.

**THERMOPYLAE**, in Ancient Geography, a strait or pass, rendered famous by the valor of Leonidas and his companions, who defended it against the army of Xerxes in the year 480 B.C.; and which, long after that celebrated event, was defended against the Gaels. This pass is the only road by which an army can penetrate from Thessaly into Locris, Phociis, Bœotis, Attica, and the adjacent countries. The following succinct description is given of this strait by the abbé Barthelemy, in his "Anacharsis". On quitting Phocis to go into Thessaly, having passed the little country of the Locrians, we arrive, says the abbé, at the town of Alpenus, situated by the sea. As it flanks at the entrance of the strait, it has been fortified. The road at first is only wide enough for the passage of a waggon; but
it afterwards enlarges itself between moraines formed by the waters of the sea and almost inaccessible rocks, which terminate the chain of mountains known by the name of Oeta. After leaving Alpenus, a floe is discovered on the left, congealed to Hercules Melanippos, and a path presents itself that leads to the summit of the mountain. Farther on, the traveller crosses a current of hot water, which gives this place its name of Thermopylae. Next to this stream is the town of Anthela; and in the plain which surrounds it are a small eminium and a temple of Ceres, in which the Amphydrons annually held one of their assemblies. On coming out of the plain there is a road, or rather causeway, only about seven or eight feet wide. Here the Phocians had formerly built a wall, to protect their country from the inroads of the Thessalians. After passing the Phenix, which at first falls into the Alpes, a river that rises in an adjacent valley, we come to the last defile, half a plethrum (15 or 16 yards) in breadth. The road then widens as far as Trachina, which takes its name from the city of Trachis, that was inhabited by the Malians. This country presents to the view of the traveller extensive waters supplied by the Sperchius and other rivers. To the E. of Trachina stands the city of Heraclea, which did not exist in the time of Xerxes.

The whole strait, from the defile before we arrive at Alpenus to that which is beyond the Phenix, may be about 48 fadia (about 2 leagues) in length. Its breadth varies almost at every step; but through its whole extent it is flinted on one side by steep mountains, and on the other by the sea, or impenetrable moraines. The road is often destroyed by the torrents, or by stagnant waters. Leonidas posted his little army near Anthela, rebuilt the wall of the Phocians, and dispatched a few advanced troops to defend the approaches. But it was not sufficient to guard the passageway of the foot of the mountain; on the mountain itself there was a path, which, beginning at the plain of Trachis, terminated, after various windings, near the town of Alpenus. Leonidas entrenched the defile of this path to the thousand Phocians he had with him, and who took post on the heights of mount Oeta. As soon as these arrangements were completed, the army of Xerxes was discovered, spreading itself over Trachina, and covering the plain with its innumerable tents. The Greeks deliberated on the measures proper to be adopted; most of the generals were for retiring to the Ithmenus; but Leonidas rejected this counsel. A Persian horsemanship was deputed to reconnoitre the advanced post of the Greeks, which was composed of Spartans; and as the rest of the army was concealed from him by the wall, he only gave an account to Xerxes of the 300 men he had seen at the entrance of the defile. After various messages from Xerxes to Leonidas, and the firm and calm replies of the latter, the Persian king was enraged, and gave orders for an attack. The Medes rushed on with fury, and one rank fell after another, while the Greeks, prelled close against each other, and covered with large bucklers, presented an impenetrable front of long pikes, and a phalanx which freth troops succressively in vain attempted to break. At length the Medes were forced away from their panic, and fled; but they were speedily relieved by the chief body of the 10,000 immortals, commanded by Hydarnes. The action now became more bloody; but the Greeks had the advantage of situation, and superiority of arms. The Persians lost many men; and Xerxes, witnessing their flight, leaped, as it is said, more than once from his chariot, and trembled for his fate. Next day the attack was renewed, but with so little success, that Xerxes depended on forcing the passageway. At length Epilates, an inhabitant of those districts, discovered to him the fatal path by which he might turn the Greeks; and served as a guide to Hydarnes and his corps of immortals, under whose conduct they arrived near the spot where Leonidas had posted a detachment of his army; and prepared to attack it. When this dreadful news reached the Greeks, their leaders answered.

Some were for retiring, and others for remaining; but Leonidas declared for himself and his companions, that they were not permitted to quit a post which Sparta had confided to their care. In the middle of the night, the Greeks, with Leonidas at their head, inflamed out of the defile, advanced through the plain, overthrew the advanced posts, and penetrated to the tent of Xerxes, who had already taken flight. They spread over the camp, and glutted themselves with carnage. The Persians were terrified and confounded, and many of them perished by the hands of one another. At length, with the dawn of day they discovered the inconsiderable number of their victors, and rallying, attacked the Greeks on all sides. Leonidas fell beneath a shower of darts; and a contest for the honour of carrying off his body, occasioned a terrible conflict between his companions and the most expert and hardy warriors of the Persian army. The Greeks, however, prevailed, and carried off their general; and having regained the defile, posted themselves on an eminence, and for some time continued to defend themselves. When Xerxes offered to Leonidas the empire of Greece, if he submitted to his power, he replied, "I rather choose to die free than to enslave my country." When the king commanded him to surrender his arms, he wrote the laconic answer, "come and take them." "The Persians are near us," said one of his soldiers to Leonidas: "rather far," he coolly replied, "that we are near the Persians." See LEONIDAS.

It has been a subject of dispute what was the number of Grecian troops under the command of Leonidas at Thermopylae. Herodotus states them at 1000, Pausanias at 11,200, and Diodorus at 7400. The abbé Barthélemy attempts to reconcile these different statements, and concludes, upon the whole, that Leonidas had with him about 7000 men. If we may credit Diodorus, he had no more than 500 foldiers when he determined to attack the Persian camp.

On the eminence to which the companions of Leonidas retired after the death of their commander, there were several monuments erected by order of the Amphydron council, in honour of the 300 Spartans, and the other Grecian troops engaged in the combat. On one of these tripodsa is inscribed, "Here four thousand Greeks of Peloponnesus fought against three millions of Persians."

THERMOSCOPE, an instrument shewing the changes happening in the air with respect to heat and cold.

The word thermoscope is generally used indifferently with that of thermometer. There is some difference, however, in the literal import of the two; the first signifying an instrument that shews or exhibits the changes of heat, &c. to the eye; formed from θερμός, heat, and οσκός, to measure, &c. and the latter an instrument that measures those changes, from θερμός, heat, and μέτρον, to measure, &c. on which foundation the thermometer should be a more accurate thermoscope, &c. This difference the excellent Wallius taking hold of, defends all the thermometers in use as thermopes; shewing that none of them properly measure the changes of heat, &c. none of them do more than indicate the same. Though their different heights yesterday and to-day shew a difference of heat; yet, since they do not discover the ratio of yesterday's heat to to-day's, they are not strictly thermometers.

THERONDEL'S, in Geography, a town of France, in the department of the Aveyron; 3 miles N.E. of Mir.

THEROUANNE, a town of France, in the department of the Straits of Calais, on the Lys. It was anciently the
the capital of the Morini, and afterwards an episcopal see, with several churches and convents; but being taken in the year 1553 by the emperor Charles V., he demolished it. The district belonging to it, however, was ceded by Spain to France, at the treaties of the years 1559 and 1659; 6 miles S. of St. Omer.

THERSA, or THANSA, in Ancient Geography, a royal town of Judea, in the half-tribe of Manasseh, on this side of Jordan. Terfa was the seat, capital, and burying-place of the first kings of Israel.

THERSA, or Thirza, a town of Palestine, in the tribe of Ephraim.

THERSARA, a town of Asia, in the interior of Asia. Ptolemy.

THERSITÆ, a people of Spain, in Iberia; they were of the number of those whom Annibal caused to pass into Africa.

THERUINGI, a people who inhabited a part of Dacia, on the other side of the Danube.

THESEON, a town of Palestine, on the other side of Jordan, in the tribe of Gad.

THESEA, or thesea, crete, in Antiquity, feated celebrated by the Athenians in honour of Theseus.

In spite of the important services that hero had done his country, in delivering it from a shamefule tribut of so many youths, of either sex, fent yearly to be devoured by the Minotaur in Crete (as the fable has it), or fent as flates to Minos, king of Crete, as the histories have it, from which he f Freed them, by overturning Taurus, Minos' general; he was banifhed for fome time, and retired to Scyros, under the protection of Lycomedes, king of that ifland, where he finally left his life either by accident, or in confequence of the jealousy of the king.

The gods, it is faid, revenged this treatment Theseus received from the Athenians, by afflicting them with a famine, which the oracle affured them they could not ceafe till they had avenged his death. Upon this they flew Lycomedes, brought Theseus' bones to Athens, placed them in a temple erected to him, and appointed Thesea to be held every eighth day of each month, in which large feries were distributed to the people, and the day was fpent, by the rich, in feafing and rejoicing, and with peculiar feomerity on the eighth day of the month Pyanepfion.

Plutarch, however, gives a different account of the origin of this feast; he fays that the Athenians, imagining they faw Theseus at the battle of Marathon under the form of a tuefary deity, confulted the oracle on this prodigy: and being ordered to collect his bones in the ifland of Scyros, removed them with great pomp to Athens; and deponed them under a magnificent monument erected in the middle of the city, which became afterwards an afylum for flasses, in commemoration of the fuccour afforded by this prince to the unfortunate during his life. They also erected a temple where they offered facrifices, &c. At Rome, Theseus was held in very different estimation, for Virgil (Aen. lib. vi.) places him in Tartarus, among thofe who were tormented for their crimes.

THESEUS, in Biography, a hero celebrated in the fabulous ages of Greece, and referred by chronologists to the thirteenth century B.C. was the illegitimate fon of Ægeus, king of Athens, by Æthra, daughter of Pittheus, king of Teucria; and as he advanced towards maturity discovered a vigorous spirit in an athletic frame. In his journey to Athens by land he met with many adventures and conflicts, and on his arrival found the city agitated by diffenfions. The fons of Pallus, the brother of Ægeus, suspecting that the aged and childfles sovereign would adopt this newly arrived stranger for his heir, fomented his jealousies, fo that Ægeus prepared poison for dispatching him; but before his plan could be accomplished, he discovered by certain tokens that he was his fon. The confequence of this discovery was a revolt of the Pallantides, which Theseus fuppreffed.

For an account of the further exploits of Theseus for the relief of the Athenians, we refer to our article History of Athens. Theseus having, in the manner there related, eftablihed a confederation for the Athenians, yielded to the impulfe of ambition; and quitting his throne, and fometimes in the company of Hercules and fometimes of Pirithous, fon of Ixion, king of Thellaly, whose friendship he had secured, undertook a variety of enterprizes, the account of which is fo intermixed with the fabulous, that it is impossible satisfactorily to develope it. He is faid, however, to have conquered certain Amazons on the banks of the Thermopy, in Asia, taking a queen from among them for his wife; to have affifted Pirithous in overcoming the Centaurs in Thellaly; and to have stolen away from Sparta the celebrated Helen; and afterwards to have joined the fame friend in a fimilar attempt upon Proserpina, the daughter of Alcmena, king of the Moloiânes, in which Pirithous lost his life, and Theseus underwent an imprisonment, from which Hercules procured his escape. Upon his return from this romantic expedition, he found his kingdom and family in confusion. Calfort and Pollux, the brothers of Helen, ravaged Attica by way of revenge for the inftult offered to their sister. His queen Thedra, falling in love with Hippolytus, his fon by the Amazon, and being rejected, calumniated him to his father, and occafioned his death, as his tragedy has recorded. From a variety of circumftances that occurred, Theseus finding that he had loft the attachment of the Athenians, abandoned the city, and intended to repair to Demetrius, fon of Minos, now reigning in Crete. In his paffage thither he was driven by a frcorn to the ifle of Scyros, where he was kindly received by the king, Lycomedes; but foon afterwards he loft his life by a fall from a rock. (See THESEA.) The reparation of the Athenians afterwards fubfided, and they regarded him only as a hero and benefactor; and Cimon, fon of Miltiades, having conveyed his bones, as they were fuppos'd to be, to Athens, in confequence of the injuncfions of an oracle, a magnificent temple was erected over them, which was made an afylum for the unfortunate. Its remains ftill subsist as one of the nobleft relics of ancient art in that famous capital. Plut. in Vit. Thefci. Aice. Univ. Hist. Travels of Anacharsis, vol. i.

THESIN.—Per Aris and Thefis. See Per Aris.

THESIS, signification, formed from τῆς θεῖας, I put or lay down, in the Schools, a general proposition, which a perfon advances, and offers to maintain.

In the college it is frequent to have placards, containing a number of theses in theology, in medicine, in philosophy, in law, &c. The maintaining a thesis, is a great part of the exercife a student is to undergo for a degree.

The thesis, in Logic, &c.—Every proposition may be divided into thefis and hypothetical; thefis contains the thing affirmed or denied, and hypothetfis the conditions of the affirmation or negation.

Thus, in Euclid, if a triangle and parallelogram have equal bases and altitudes (is the hypothetical), the firth is half of the second (the thefis).

Aris and Thefis. See Aris.

Thesis, bona, deposito or remiffo, the beating down the hand or foot at the beginning of a bar in music. See Aris, tally, which is the fifting up the hand or foot in the middle or latter part of a bar.

THESISUM, in Botany, an ancient name, adopted from the Greeks, enumerated by Linnaeus, Phil. Bot. 174, among those...
chiefly derived, is extremely difficult, and, after all, doubtful. Pliny has the Thesium in two places: book 21, chap. 17, and book 22, chap. 23. In the former, it is mentioned amongst bulbous plants, as having a harsh taste: in the latter, it stands next to Picris, as very bitter, and purgative. This last account is copied from Theophrastus, who, in his book 7, chap. 11, speaks of θέσιων in the same terms, along with a number of plants of the Sow-thistle and Dandelion tribe, or Cicuraceae. To these indeed some of the Arum family are subjoined, and Thesium is placed at the end. All we can hence gather is, that the plant in question may possibly be some plant of the Syngenia Polygamia-equales, of the section Spermopodia, whose root is tuberous. Of this description there are several natives of Greece; see Scorzonera, n. 12 and 13. Ambrofins derives the word from στειφειν, or rather a peer tradescant, because, as he thinks, of its being serviceable in many respects, both for food and medicine. Possibly Linnaeus, who frequently confounded this author, may hence have been led to apply the name of Thesium to the present genus, totally different indeed from all that is recorded of the Greek θέσιον, but remarkable for its sweet habit and hard texture.—Linn. Gen. 114. Schreb. 160. Willd. Sp. Pl. v. 1, 12. 1211. Mart. Mill. Dict. v. 4. Sm. Fl. Brit. 269. Profr. Fl. Græc. Sibth. v. 1, 162. Ait. Hort. Kew. v. 2, 64. Pursh 177. Brown Profr. Nov. Holl. v. 2, 152. Juss. 72. 75. Lamarck Histo. t. 142. Gurt. t. 86. Clafs and order, Pentandria Monogynia. Nat. Ord. V. p. 307. Linn. Elsinog. Juss. Sankt. Linæ. Brown.

Gen. Ch. Col. Perianth superior, of one leaf, tubular, in four or five cleft fragments, internally coloured and hairy, permanent. Cor. none. Stam. Fragments equal in number to the fragments of the calyx, but not so long, inserted into their base, awl-shaped; anthers roundish, of two lobes. Pist. German inferior, roundish, confluent with the base of the calyx; style thread-shaped, the length of the fragments; stigma tumid, cloven. Peric. none. Sred. Nut oval, angular, coated, crowned with the permanent involute calyx, of one cell, with a foliaceous kernel.

Eff. Ch. Calyx superior, of one leaf, bearing the fragments. Corolla none. Nut solitary, coated, crowned with the calyx.

Obf. Our learned friend Mr. Brown proposes to separate the Cape species of this genus from the rest, perhaps even into two distinct genera; but as we cannot find sufficient grounds for this measure, we shall admit the whole here, at least till we can obtain fuller information. Th. Colpoon, Linn. Suppl. 161. Willd. n. 18, is of course excluded, having a Drupa, and a very different habit. This is described, by some one of our correspondents, under the article Fusanus. See also Leptoneria. We are enabled to add a few in its stead to Willdenow's list, but cannot adopt such as are merely named by Mr. Brown, unless where we happen to have specimens.

The whole genus is of a rigid broom-like habit; sometimes roughish, though scarcely pubescent; with simple, usually very narrow, scented leaves; and inconspicuous green, whitish, or yellowish flowers, either clustered, spiking, or somewhat capitulate.

1. Th. lingulophyllum. Baffard Toad-flax Thesium. Linn. Sp. Pl. 301. Willd. n. 1. Brit. Fl. Brit. n. 1. Profr. Fl. Græc. n. 1. Engl. Bot. t. 257. Pollich Patat. v. 1, 238. Roth. in Sims and Konig's Ann. of Bot. v. 2, 18. (Th. pratense; Ehrh. Herb. n. 12. Th. montanum; ibid. n. 2. Th. intermedium; Schrad. Spicil. 27. Acanthos lini folio; Clus. Hift. v. 1, 323. Linaria adulterina; Ger. Em. 555.)—Stem erect, somewhat branched. Cluster mostly compound. Bracteas ternate. Leaves linear-lanceolate. Tube of the calyx cup-shaped, very short.—Native of dry chalky hills throughout most parts of Europe, though reckoned among our rarer English plants, flowering in July. The roos is woody, perennial, branched, crooked, whitish, fending up several erect or reclining, smooth, leafy, more or less angular, rigid, branched stems, from four to twelve inches high. Leaves numerous, alternate, linear, entire, in some degree succulent and glaucous, minutely rough at the edges, as are sometimes the angles of the stem. Clusters, rather than spikes, more or less branched, or even panicled, each branch bearing one or more flowers, either solitary at the extremity, accompanied by three lanceolate, leafy, unequal bracteas, or without bracteas, in the fork of the stalk, whose divisions bear other flowers, with one or more bracteas. The latter is the more luxuriant state of this plant, in which it has been called intermedium by Schrader, and montanum by Ehrhart; we cannot see, by original speciments, that these two suppos'd species differ at all, not even so as to merit Wildenow's distinction of them as varieties. Our English plant is less luxuriant, answering to Pollich's excellent description. The calyx is turbinate, having hardly any tube: its limb five-cleft, whitish, spreading, acutely five-cleft, sometimes with intermediate teeth; closely involute after flowering. Anthers yellow. Stigma white, of two knobs. Fruit hard, frated, with five angles. The herb is scarcely bitter, a little fœthous. It usually grows among grass, which it so much resembles at a little distance, as not to be readily discernible. The pure air of the open hills about Bury, and similar situations, seems to fuit this plant, though the soil does not much promote its luxuriance of growth.

2. Th. ramatum. Brachy German Thesium. "Hayne in Schrad. Journ. v. 1, 30, 4, 5." Roth in Sims and Konig's Ann. of Bot. v. 2, 18. Marfich. von Biebcrst. Cac. v. 1, 175. (T. alpinum; Pollich Patat. v. 1, 239.)—Stem erect, branched. Clusters elongated. Bracteas ternate. Leaves linear-lanceolate. Flowers three or four-cleft, with a very short, cup-shaped tube.—Native of heaths, and sandy pastures or woods, in the Palatinate, flowering at the same time as the preceding. Not having been able to ascertain this species amongst our speciments, we shall copy Pollich's description, having endeavoured to improve our specific character by the alliteration of that faithful and instructive writer. "The root," says he, "is white, fibrous. Stem erect, from three inches to a foot high, round, frated, smooth, branched from the very base; the branches alternate, very short. Leaves alternate or scattered, linear-lanceolate, sharpish, entire, rather fœthous; convex on one side, flat on the other; fœthous, above an inch long, three-quarters of a line wide. Flowers solitary and fœthous at the ends of the very short branches, between three leaves, of which the two lateral ones are smaller than the third. There is a white roundish basis, or receptacle, on which each flower stands. The calyx is two lines in diameter, green without, white within, having but three or four segments, which spread croswise. Anthers pale yellow. Stigma white, capitulate. Evidently different from the foregoing," Pollich. He mistakes however in his reference to Linnaeus, Gerard, and Haller. As to Jacques's Enumeration, 90 and 213, we have no positive means of determining, the tube of the calyx not being there described. Marcelli von Biebcrst. considers our English plant, above described, as belonging to this species, and not to lingulophyllum.

THESIUM.

12. Th. capitatum. Capitate Thefium. Linn. Sp. Pl. 202. Wild. n. 9. Thumb. Prodr. 46. — Flowers capitate, sessile, terminal. Leaves three-edged, pointed, smooth. Bracteas ovate. Segments of the calyx strongly pointed; densely woolly within.—Native of the same country. The fém is hard and shrubby, with alternate distant bracteas; the upper ones gradually longer. Leaves alternate, small, awl-shaped, pointed. Heads of flowers terminal, a fresh branch shooting out from beneath each. Segments of the calyx very much pointed, and internally villous throughout their whole length. Linnaeus. In his herbarium it is specimens which answer to this description, though left by him without

7. Th. lineatum. Lincated Thefium. Linn. Suppl. 162. Thumb. Prodr. 45. Wild. n. 4. — Leaves linear—awl-shaped, recurved. Stem round. Flowers axillary, sessile.—From the same country. Thunberg says the flowers are flaked. The younger Linnaeus remarks that the recurved, or reflexed, foliage gives this plant a very fquarrose aspect. It does not appear that he pollied any specimen.

9. Th. Friesia. Little Trailing Thefium. Linn. Mant. 213. Wild. n. 6. Thumb. Prodr. 46. — Stem decumbent. Leaves awl-shaped. Flowers spikèd; densely woolly within. Fruit globose, wrinkled.—Found at the Cape of Good Hope by Koenig, who sent specimens to his preceptor Linnaeus, under the new generic name of Friesia, by which, we presume, he meant to commemorate his own countryman Christian Friis Rotblid; but Linnaeus reduced the plant to Thesium. It is one of those species whose calyx is densely lined with reflexed pubescence, and of which Mr. Brown has, justifiably perhaps, made a distinct genus, on that account. Yet it has all the habit of an European Thesium. The little woody knobbled root sends forth numerous decumbent, simple, leafy, roundish, smooth fém, two or three inches in length. Leaves not an inch long, linear, acutely pointed; channelled above. Flowers sessile, each accompanied by two small acute bracteas. Calyx in five deep, lanceolate, acute segments, with scarcely any tube; their dense internal white woollines did not escape Linnaeus. Fruit nearly globose, much wrinkled, not so large as Coriander-feed.

10. Th. funeæ. Stringy Thefium. Linn. Sp. Pl. 322. Wild. n. 7. Thumb. Prodr. 45. — Stem with numerous long, nearly naked, branches. Leaves, and lateral bracteas, awl-shaped, very short. Flowers spikèd; their segments lanceolate, densely woolly within.—Native of the Cape. The spikèd round smooth fém, with its numerous crowded upright branches, has a very fquarrose aspect. The little leaves are f quarry scattered. The spikes are terminal, solitary, feafly an inch long, composed of several small, crowded, not quite felli, flowers, in ftricture like the laf; each accompanied by one ovate, pointed, keeled bratetia, and a pair of minute, lateral, awl-shaped ones.

11. Th. fpicatum. Large-spiked Thefium. Linn. Mant. 214. Wild. n. 8. — Stem erect, repeatedly branched. Leaves awl-shaped, minute, scattered. Flowers spikèd; their segments linear, densely woolly within. Lateral bracteas lanceolate.—From the fame country, growing on hills. Allied to the laf, but thrice as large in almost every part, with a f stout, round, ftai:lar, determinately branched fém. The leaves however are even more minute than in that fpecies. The spikes are thick, of numerous, very densely crowded, flowers, which Linnaeus defines leaves, smooth, apparently in contradifferentiation to those of Th. funeæ; but however smooth, or even, like that, externally, their segments, which are linear, narrow, and parallel, are full as hairy or woolly within. The outer bracteas are much dilated and rounded in their lower half; the lateral ones also are broadly lanceolate, very different from those of funeæ.

8. Th. fquareum. Recurve-leaved Thefium. Linn. Suppl. 162. Thumb. Prodr. 46. Wild. n. 5. — Leaves linear—awl-shaped, recurved. Stem round. Flowers axillary, sessile.—From the same country. Thunberg says the flowers are flaked. The younger Linnaeus remarks that the recurved, or reflexed, foliage gives this plant a very squarrose aspect. It does not appear that he pollied any specimen.

4. Th. erraticum. Naked-flowered Thesium. “Hayne in Schrad. Journ. v. 1. 32. t. 7. Termin. Bot. n. 6. t. 26. f. 4.” Roth in Sims and Kon. Ann. of Bot. v. 2. 18.—Stem erect, unbranched. Cluster simple. Flowers without lateral bracteas; their tube cup-shaped, very short. —Found near Berlin, by Mr. Hayne, author of an elegant German and Latin work on botanical terminology. We have an authentic specimen from professor Schrader, though we accidentally are deficient in that Faciculus of his Journal, which contains the description of the present species. No dispute can arise as to its difference from all the foregoing. The wide shallow form of the calyx is like the two first, but the narrow fowages, and the long narrow terminal bracteas, agree with Th. alpinum. The total absence of the pair of smaller lateral bracteas, essentially distinguishes it from all three.

5. Th. humile. Dwarf Thefium. Vahl Symb. v. 3. 43. Wild. n. 3. (Achimilla linaria folio, floribus et valvis in febrium alis felliibus; Shaw Afric. n. 14.) — Stem erect, branched. Flowers axillary, sessile, five-eleft; their tube very short. Gathered in cultivated ground near Tunis, by Vahl, who refers the synonym of Shaw, applied by Linnaeus, not without error, to his alpinum; from which therefore it must of course be erased. The present is said to be annual, with an herbaraceous fém hardly three inches high, branched from the base; branches smooth, angular, somewhat divided, as tall as the main fém. Leaves linear, thick, numerous, acute, an inch and half long. Tube of the calyx feaxly any; not elongated as in Th. alpinum. Fruit globose, rugosé, the size of Coriander-feed. Vahl.

6. Th. asperula. Australian Thefium. Dr. n. 1. — Cluster simple, elongated, somewhat spikèd. Partial-flats shorter than the flower. Calyx four or five-eleft; its segments bordered longitudinally, rather longer than the tube.—Gathered by Mr. Brown, at Port Jackson, as well as in Van Diemen’s land, and on the south coast of New Holland. We have seen no specimens.
out any specific name, he having originally described the
present species in Van Royen’s Prodrumus. The younger
Linnaeus took these specimens for *fearum*, with which they
agree only so far as to confirm their being the *capitaturn*,
contrasted therewith in Sp. Pl. Their leaves however can
hardly be termed small, measuring near an inch in length.
The *bracteae* have dilated membranous edges; fringed, as
Thunberg describes them. *Calyx* with an oblong, five-
angled tube. We cannot so blindly follow Willdenow, as to
infer any species between this and *fearum*.

Leaves three-edged, pointed; their edges very rough with
cartilaginous teeth. — Native likewise of the Cape. Nearly
 allied to the last, though undoubtedly a very distinct species.
The leaves are but half as large, and remarkable for the
cartilaginous teeth of their three edges.

Linn. Mant. 214. Willd. n. 10. Thunb. Prodr. 45.—
Leaves lanceolate, with a deciduous keel. Cymes terminal.
*Calyx* obtuse, smooth, except at the back of each flamen.
— Found at the Cape, and first described by Bergius.
Linnaeus originally referred the description of this author
to his own *Th. capitaturn*, from which scarcely any species
can be more distinct. In general dimensions, and shrubby
habit, indeed they are not unlike; but the leaves of the
present plant are much fewer, and more distant, and the in-
*florifcence* totally different, being a sort of compound irregular
umbel, or cyme. The *calyx* being smooth both within and
without, except a slender tuft of hairs at the back of each
flamen, as observed by Mr. Brown, reduces this species to a
different section, according to that author, along with
*saquariform*, n. 8, *fragile*, n. 16, and some others.
A note at the back of one of the Linnaean specimens of *Th. sirium*,
gathered by Sprengmann, says “the fruit is a *drupa*, like
that of *Praunus Padus*.” If so, this species should seem referrible to some other genus, as *Fusanus*; yet their habits are
too dissimilar.

Pl. 302. Willd. n. 1. Ait. n. 2. Pursh n. 1. (Cen-
taureum luticum acrocyrides virginianum; Pluk. Mant. 43.
Phyt. 1. 342. f. 1.)—Flowers umbellate. Leaves elliptic-
oblong.—On dry hills and fields, from New York to Caro-
lina. Pernal, flowering in June and July.—*Flowers* white.
Pursh. Mr. Aiton records its having first been introduced
into the British gardens in 1782, by the late Dr. Hope, profeffor of botany at Edinburgh. This is an
herbaceous species, about a foot high, erect, scarcely branched,
except at the top, and having more of the apect of some annual *Euphorbias*, than of the genus of which we are
 treating. The *leaves* are scattered, on short stalks, erect,
smooth, nearly oval, about an inch long. *Flowers* three or four together in small umbels, on slender, solitary
*flalks*, either axillary or terminal. *Bracteae* three or four
under each umbel, pale, lanceolate, deflexed. Mr. Brown
says the character of the *flower* of this, the only American
species, is between *Fusanus* and *Sanatium*. Of the fruit
nothing is known.

Willd. n. 12. Thunb. Prodr. 45.—Leaves three-edged,
somewhat ovate, keeled, deciduous. Stem angular. *Flowers
axillary, effuse.—Discovered by Thunberg at the Cape of
Good Hope. We have seen no specimen of this species.
It is said to have the habit of a *Salsola*, and to be extremely
brittle. The *leaves* are so very short, that at first sight
they seem to be altogether wanting.

branches diffuse, panicled, angular, many-flowered.
*Flowers* foliar, falked. *Leaves* awl-shaped.—From
the Cape of Good Hope,—The *flam* is round, fburbby, with
several round primary branches, subdivided throughout into
many lateral and terminal, slender, angular ones, repeatedly
and irregularly cloven and forked, bearing innumerable,
small, terminal, falked, solitary *flowers*, each of which is
inferted by five or five sharp awl shaped *bracteae*, which
Linnaeus describes as an inferior, but not a proper, *calyx*.
The real *calyx* is obtuse and fivel-efte.—*Fruit* like Coriander-
seed. Many of the flowers are abortive. The *leaves* are
scattered, and for the most part very minute. Mr. Brown
does not mention this species, perhaps from not having been
able to examine the inside of the *flowers*.

Brown Prodr. Nov. Holl. v. 1. 353.—Stem much branch-
ed, panicled; branches erect, many-flowered. *Flowers
capitate. Leaves lanceolate, channeled, deciduous, acute.
—Native of the Cape of Good Hope. This has a round
shrubby *flam*, with the panicled habit, and innumerable
small *flowers*, of many *Species*. The younger Linnaeus con-
6ounded it very negligently with the last, and it seems to
have passed undescribed, being only mentioned in Mr.
Brown’s work, by the apt name it bears in the Bankfian
herbarium. The *leaves* are pretty numerous, minute, spreading,
concave, broad at the base; deciduous at the margins and
keel. *Flowers* fellite, two, three, or four, in each little
terminal head, accompanied by several imbricated, ovate, keeled, sheathing *bracteae*, partly jagged or fringed
at the edges. These *bracteae* evince the true nature of what
Linnaeus terms, in the foregoing, an inferior *calyx*.

Mant. 213. Willd. n. 15. Ait. n. 3.—“Clusters terminal.
Leaves heart-shaped, fellite.”—Native of lofty hills at
the Cape of Good Hope.—Stem rather woody, erect, some-
what angular, four feet high, smooth. *Leaves* alternate,
fellite, clasping the *flam*, heart-shaped, entire, rather acute,
smooth, thickish, an inch long. *Clusters* terminal, conflit-
ing of minute *flowers*, intermixed with large ovate *bracteae*.
Linnaeus. Neither Mr. Brown nor profeffor Thunberg men-
tion this species. There is no authentic specimen of it in
the Linnaean collection, and we are almost convinced of its
being the same plant as the following. Willdenow has made
a singular miftake in copying the fpecific character of *Th.
Frisia*, see n. 9, over again, for the *plexicaule*, which
stands above it in the *Manifia*.

Prodr. 46. (Planta africana frutecens, portulaca folis,
Morgiani Syrorum, ex brevi pediculo binis, firmulis; Pluk.
Amalth. 173.)—Stalks three-flowered, terminal. Leaves
roundish-ovate, acute, fletthy. Stem shrubby, with alter-
ate corymbofe branches.—Native of the Cape of Good
Hope. This was adopted from Bergius by Linnaeus, with-
out seeing a specimen, at least from that author. One is
preferred in his own herbarium, on which he had written
*Thesium capense*, which his fon altered to *euphorbiioides*,
considering it as the fame with the plant of Bergius. A similar
specimen lies in the Bankfian collection for *Th. amplexicaule*.
Both names are excellent, but perhaps *euphorbiioides*, as the
original
original one, ought to be preferred. The plant is of a
brittle shrubby habit, turning black in drying. Leaves about
the size of the finger-nail, alternate, sessile, ovate or rather
heart-shaped, clasping the stem, acute, entire, glandular, smooth,
without rib or veins. Flowers about the tops of the alternate
corymbose upper branches, enveloped in bracteas, like
the leaves, but smaller. Tube of the calyx very short,
and strongly angular; limb smooth within, except perhaps a
few minute hairs behind the flowers, indicated by Mr.
Brown. Fruit globose, usually angular at the top.

Suppl. 162. Willd. n. 16. Thunb. Prodr. 46.-"Leaves
 lanceolate. Stem angular. Flowers axillary, trifoliate,
compound."—Gathered by Thunberg at the Cape.
The flower-flasks are three-flowered, sometimes divided, or
three-cleft, greatly divaricated. Linn. We have met with no
specimen answering to this species, nor does Mr. Brown
adept to it.

awn-shaped, spinous-pointed, spreading, felthy, deciduous.
Flowers axillary, stalked, solitary. — Gathered by
Thunberg at the Cape. A very singular species, whose woody
decumbent perennials are beset with numerous, ascending, funce
branches, two or three inches long, clothed with alternate,
horizontally projecting, glandular leaves, one-third of an
inch in length, giving the plant the aspect of an Ulex.
Flower-flasks about as long as the leaves.—Mr. Brown
places this in his section of such Cape species as have the
calyx internally naked, except a slender tuft of hairs behind
each flower. With it ranges squamulatum, fragilis, filicium,
spinifolium, ericoides, euphorbiaceae, and one unknown to us,
called fruticetum. The scent whose calyx is lined with a
dense deflexed beard, consists of Prunus, bullata, ficatam,
capitatum, and seuabrum, besides five species unknown to us,
called caffiffolium, terebrifolium, dible, ciliatum, and divari-
catam.

THESMOPHORIA, Θέσμοφορία, in Antiquity, a festival
in honour of Ceres, which was celebrated by many
cities of Greece; but especially the Athenians observed it
with great devotion and pomp. For the ceremonies of this
festival, see Potter, Archzool. Gez. tom. i. p. 403, eqn.
See CEREA and ELEUSINIA.

THESMOTHERME, Θέσμοθρημα, an appellation given
to fix of the nine Athenian archons; the first and chief
of the nine was called, by way of eminence, archon; the
second in dignity was called boleus; the third, polemarchus;
and the other fix, thespia: for an account of whose
power and jurisdiction, see Potter, Archzool. Gez. tom. i.
P. 77.

THESPANIS, in Ancient Geography, a river of Aetis,
Sarmatia; the mouth of which, according to Ptolemy, lay
between that of Rhenumus and the town of Azara.

THESPHAIA, Θήσφαία, in Antiquity, an appellation
given to oracle. See ORACLE.

THESPIS, or THESP., in Ancient Geography, a town
of Arcadia, situated at the foot of Mount Helicon, about
50 stadia from the city of Thebes. The Thebans, who
destroyed this city, spared nothing but the sacred monu-
ments, among which were the temple of Hercules, which
was served by a prieutes confined to celibacy during her
whole life, and the statue of that Cudus (or Cupid),
sometimes confused with the god of love, which was
only a shapeless stone as it was dug in the quarry, for thus
the objects of public worship were reprehended in ancient
times. Praxiteles is said to have formed a statue of Cupid
of Pentelic marble; and Lyseus made one of bronze.

The Thespians reported, that the statue of Praxiteles
was taken away by Caius, the Roman emperor; but others
say, that it was returned by Claudius, and that Nero
removed it to Rome, where it was consumed by fire.
This statue was so beautiful, that, according to Cicero,
Theophis was visited merely for the sake of seeing it. The Cupidion
that existed in the time of Paunias was an imitation of
that of Praxiteles by Meonorus, the Athenian; but here
were a Venus and Flora in marble, executed by Praxiteles
himself. In one quarter of the city there was a temple
consecrated to Venus Melanis. The temple was a beautifull
structure, ornamented with a statue of Hecid in bronze.
Near it was a Victory in bronze, and a chapel consecrated
to the Muses, each of which had a small statue in marble.
At Theopia there was a statue of Venus in marble, made
by Praxiteles.

THESPIADES, in Mythology, an appellation given
to the Muses from the city of Theophis, where they were
honoured.

THESPIS, in Ancient Geography, a town of Thessaly,
in Magnesia.

THESPISANA, the name of an antidote intended for
internal scabres.

THESPIS, in Biography, an ancient poet, and the
founded inventor of tragedy, was born in a small borough
of Attica, named Icara, and he, as well as Sphorion, a native of
the same place, appeared each at the head of a company of
actors, one on a kind of stage and the other in a cart. Sphorion
attacked the vices and abominations of his time, and represented
his first pieces towards the year 520 B.C. Thefis treated
nobler subjects, which he drew from history: he appeared
some years after Sphorion, made his first attempts in tragedy,
and acted his Alcestis in the year 536 B.C. He was
followed in this species of drama by Aeschylus, Sopho-
icles, and Euripides. Thefis having observed at the festi-
ivals, in which before his time hymns only were sung, one
of the fingers, mounted on a table, forming a kind of dia-
logue with the chorus, took the hint of introducing into his
tragedies an actor, who by simple recitals, introduced at
intervals, should relieve the chorus, divide the action, and
render it more intelligible. This innovation, together with
some other liberties in which he indulged himself, alarmed
Soline, the legislator of Athens, who condemned a species
of composition, in which the ancient traditions were dis-
guised by fiction. "If we applaud falsehood in our public
exhibitions," said he to Thefis, "we shall soon find that
it will infalute itself into our most sacred engagements."

The excessive approbation and delight with which both
the city and country received the pieces of Thefis and
Sphorion, at once justified and rendered useful the fulcru-
ful forefist of Solon; the poets, who till that time had only
exercised their genius in dithyrambs and licentious satire,
fruck with the elegant forms which these species of com-
position began to assume, dedicated their talents to tragedy
and comedy. See TRAGEDY.

Thefis, according to the description of Horace, ex-
tended his plan farther than the introduction of a single
actor in the intervals between the songs of the chorus, to
the representation of some fable by actors on a kind of
moveable stage, which alternately sung and played, with their
faces turned by the bees of wine.

"Ignorant tragediae genus invenisse Camenae
Dicitur, et pleuratis vexisse poenitit Thefis,
Ut canerent agonumque concivit facibus ora."

Art. Poet.

Some writers have mentioned three pieces of Thefis,
THE

THE SPONTI, a people of Epirus, who inhabited Thessaly, in the vicinity of the Ambraeciates; and formed one nation with the Chaoioni. They derived their name from Thisproton, the son of Paflegus, who was the son of Lycoiog, and who was the first that conducted the Paflegus into Epirus.

THESPONTI, a small country of Epirus, S. of Chonia, having to the E. the lake Ambraecus and Ambraeci, and to the S. the sea. This country was watered by three rivers, which ran from W. to E., viz. Thias, Coeytas, and Acheron.

THESSALIA, THESALY, a celebrated country of Greece. This country, comprising Magnesia and other small districts which have particular denominations, is bounded to the E. by the sea, to the N. by mount Olympus, to the W. by mount Pindus, and to the S. by mount Oeta. From these permanent boundaries branch out other chains of mountains and hills, that wind through the country, occasionally embracing fertile plains, which, from their form, and the manner in which they are inclosed, resemble vast amphitheatres. Opulent cities are seated on the heights that encircle these plains; and the whole country is watered by rivers falling in general into the Peneus, which, before it looses itself in the sea, flows through the famous valley of Tempel. The Apeiron, or Apidanus, proceeded from the S. where was Dolopla, ascended northward (see Peneus), traversed the plains of Phalnoria in the Thessalian coast, and discharged itself into the Alpheus, W. of Larissa. (See APIDANO.) The Onchelius, or Onchones, took its rise S. of Larissa, passed by the Palus Borbeis, and after having received the Naurus, discharged itself into the Pelasgic gulf, between Demetrias on the left and Pagan in the right. The Sperchius commenced S.W. in an angle which was formed by the chains of Pindus with those of mount Oeta, ascended N.E., watered Sperchium, turned to the E., and having passed Hyppata, received the Athelous of Thessaly, which proceeded from mount Othrys, and being joined by the Lamina, discharged itself into the Malac or Lamiac gulf. The country was marshy, and abounded with a variety of plants, fome of which were medicinal and fanotive, and others venomous and pernicious. The knowledge of their different properties caused the Thessaliens to be regarded as a clafs of forcers, who possessed the art of producing supernatural effects. The principal people of Thessaly were the Athenae, situated towards the N.W., whose chief town was OXinia, near a lake that lay between small chains of mountains;—the Pelagoni Tripolitis, in a kind of hollow territory, separated from Macedonia by a chain of mountains, called Cambrunni montes; denominatod Tripolitans on account of their three towns, Dolicha, Pythum, and Azorus; in the eastern part of this territory was the Aecuris palus, or marsh Aecuri:—the Perrhab, lying S. of the mountains which formed this territory, and extending from W. to E., the N. of the Peneus:—S. of the Peneus, towards the W., was the Elisotis, watered by the rivers Ion and Theues, and bounded W. and S. by mount Pindus: its most considerable towns being Comphi, Trica, Peliasum, and Phaciodon:—the Paflegiots, towards the E., having the Peneus to the N. and commencing W. from the Apidanus, which received the Elipeneus, that pafted to Pharsalia: the principal towns of this part of Thessaly were Larissa, reckoned the capital of Thessaly; Pharsalia, one of the largest and most opulent towns, now Pharsalia, Scytopha, Cranna, &c.:—the Thessaliots being to the S. and watered by the Elipeneus in the lower part of its course, and having to the S. mount Othrys, and to the S.W. Dolopia; its principal town was Metha upon the Elipeneus:—the Phthiotic, towards the S.E., terminating in a peninsula, and watered by the Sperchius and Acheron; its principal towns were Phraes, to the N.; Thauacas, to the W., commanding one of the finest prospects in Greece; Alos and Lamia, towards the middle; Phalar, at the bottom of the Amalac gulf; in the peninsula, Thebes, Lariss, Cremona and Echium: at the extremity the port of Apheta, and S.E. Heralde Trachion, the road from which led to the fraits of Thermopylae: which fee. Magnesia was separated from the sea by mount Pelion: here were the towns of Demetrias and Ioloeos, and S.E., on the eastern coast, the town of Magnesia, and at the extremity of the peninsula to the S.W. the town of Antium. At the bottom of the Pelasgic gulf were the two small islands of Deucalion and Pyrrha. Dolopia lay towards Atolia, and contained no considerable towns. The extremity of the S.E. of Magnesia was terminated by the promontory Sepias, where the fleet of Xerxes was battered by a tempest. The town of Gunas, at the entrance of the valley of Tempel, was the key of Thessaly on the fide of Macedonia, as the port of Thermopylae was on the fide of Phocis. See Thessaly.

The several nations which we have recounted, as properly Thessalian, were formerly governed by kings, but after various revolutions became for the most part subject to an oligarchy. The fates and the towns were independent of each other. The confederacy of the Thessaliens, properly so called, was the most powerful of all, both from the number of towns pertaining to it, and from the accession of the Magnesians and Perrheians which were brought almost under complete subjection. There were some free cities, unconnected with any of the fates. The Thessaliens could bring into the field an army of 6000 horse and 10,000 infantry, exclusively of their archers, who were excellent, and who from their infancy were accustomed to draw the bow. The Thessaliens are said to have been the first who managed horses with the bit, and used them in battle; and hence, it is said, originated the tradition that a race of creatures, called centaurs, half horse and half man, formerly existed in Thessaly. This country produced wine, oil, and fruit of different kinds. The land has been represented to be so rich, that the corn grew too fast, if it were not cut, or sheep turned to graze upon it. They carried on a considerable commerce in corn. The Thessaliens, though they boasted of their liberty, were the first to reduce Greeks to slavery. Amongst them they had a prodigious number of slaves, known by the name of Penelée. These people are very hospitable to strangers, and treat them magnificently. In their dress and houses luxury is conspicuous; and at their entertainments they hire dancing girls to amuse them. They are reckoned passionate and turbulent, and very difficult to be governed; and they are reproached with insincerity and falsehood. They have cultivated poetry from their most early ages, and pretend that Thessaly gave birth to Thamyris, Orpheus, Linus, and many others who lived in the heroic age; but since that period, they have produced no writer nor any celebrated artist. They were much addicted to dancing; and in some places generals or magistrates were called chiefs of the dance. Their music observes a medium between the Dorian and Ionic, and accordingly harmonizes with the character and manners of the country.
country. They have never on any occasion killed flocks, and the same punishment was inflicted on a peafon who killed one of these birds as if he had taken away the life of a man. This fact it is said, was founded on the circumstance, that flocks had freed Thelfaly from the enormous serpents which formerly infested it.

THESALICUM SEPTIME, the Thelfalian chair, fo called from Thelfaly, where chairs of this figure were moft in use: it is recommended by Hippocrates, Lib. de Art. in place of a machine for reducing a recent luxation of the shoulder-bone. The back of this chair is perpendicular to the seat, as Galen tells us, by which construction it is distinguished, and accommodated to the operation.

THESSALIOTIS. See Thessalia.

THESSALON, in Geography, a river of Canada, which runs into lake Huron, N. lat. 49° 6'. W. long. 82° 8'.

THESALONIANS, Epiflates to, in Scripture History. See Epiftle.

THESALONICA, in Ancient Geography, a town of Macedonia, in the Thracian gulf; and built on the declivity of a mountain in the form of an amphitheatre, the summit of which was defended by a caufe of great extent. Strabo says that it was named "Tharmon," and that it was only a village; that Caffander augmented it considerably, and transported the inhabitants of some neighbouring cities, and gave it the name of Thefalonica, that of his wife, the fifter of Alexander the Great. In the year 168 B.C., Macedonia was divided into four parts, and Thesalonica was the capital of the second part. Its government was regulated by magiftrates, called "Political." Under the Greek empire it continued to be governed by a fenate. Cicero, during his exile, paffed fome time at Thesalonica. This city had feveral divinities, and alfo emperors, who were objects of public worship. Jupiter was the principal; Apollo was alfo repreffed on its monuments; and the Cabiri had a temple in Thesalonica. The Cabirian and Pyrrhic games were exhibited in this city in honour of the Cabiri, and the Olympic games were celebrated in honour of Jupiter. That rich and powerful city had, for its fpectacles and the amufement of the citizens, an amphitheatre for the combats of gladiators, and a circus for the public games. The emperors Valerian and Gallienus gave it the title of a colony. It had alfo the title of Neocorus, The modern name of Thesalonica is Salonica or Saloniki. (which fee.) Although there are different routes by which goods are transported from Macedonia into the Austrian dominions, the beft, fays Dr. Holland in his Travels into Albania, &c. is through Bulgaria, by Widin and Offovo, where it enters the Austrian territory, and is then continued through the Bannat by Tomsvar, Pelt, Raab to Vienna. The goods landed at Salonica are made up in packages of 14 hundred weight, and two of these are the load of a horfe. The cavalcades for this inland journey confift ofen from 200 or 300, and sometimes of 1000 horses. The property fo transported, at a moderate estimate, might be worth 30,000l. on its arrival in Germany. The time occupied between Salonica and Vienna was in general thirty-five days, exclusive of the quarantine at Offovo, which sometimes took place. The cavalcades usually travel eight hours in the twenty-four.

THESSALY, or JANNA, in Geography, a province of European Turkey, bounded on the N. by Macedonia, on the E. by the Archipelago, on the S. by Livadia, and on the W. by Livadia and Epire, anciently called Thesalia, Pelagia, and Pyrrhs, (see Thessalia,) and now by the Turks Janna. It was sometimes annexed to Macedonia, and sometimes separated from it. The celebrated mount

Pindus, now Meifova, or Meffo Novo, separated it from Epirus, or a part of the prefent Albania. Amongf its once celebrated twenty-four mountains, the moft remarkable are Olympus, Pelion, and Oifa. Here are alfo situated the plains of Pharsalia, and the delightful valley of Tempé. The country is extremely fertile, and retains its ancient character in this respect. It produces oranges, citrons, lemons, pomegranates, very fweet grapes, excellent figs and melons, almonds, olives, cotton, and chinamus, which take their name from Callanca in Magnesia. The modern Thesalian are a well-made spiritifed people. The moft remarkable places in the country are Larissa and Janna. See Thessalia.

THESTIA, in Ancient Geography, a town of Epirus, in Acmarnia.—Alfo, a river of the Peloponnesus, in Laconia.

THESTIDION, a town of Greece, in Theffaly.

THESTIS, a town which belonged to the Arabs.—Alfo, a town of Africa, in Libya.—Alfo, a fountain of Africa, in the Cyrenaica, near Yrifa.

THETA, 6, among the Ancients, one of the Greek letters. It was ufed as a mark on the ballots of judges, by which they condemned the perfon to death, it being the firft letter of the word 60o0, death. Whence it had the epithet of niger and inflinx, thus:

"O multum ante alias inflinx iterata theta."

THETES, 6o0, in Antiquity, the lowest clafs of people at Athens. Aristides repealed Solon's law by which the thetes were made incapable of bearing an office in the government.

THETFORD, in Geography, an ancient borough and market-town, partly in the hundred of Shropham, and county of Norfolk, and partly in the hundred of Lackford, in the county of Suffolk, England, is situated at the distance of 28 miles S.W. from Norwich, and 80 miles N.N.E. from London. It was a place of considerable confluence at an early period.

Thetford, called in the Saxon Chronicle Thedford, has an acknowledged claim of having been once the seat of the East Anglian kings. Being the metropolis of that portion of the heptarchy, it became subject to the ravages of the Danes, by whom it was repeatedly laid in ashes. From numerous coins, it is evident that there was a mint at Thetford from the time of Athelstan to the reign of king John. At the eastern extremity of the town are some extensive remains of fortifications, consisting of a large artificial mount, or keep, with lofty banks and deep ditches. These fortifications were probably first formed by the early kings of East Anglia, and the keep an addition, made subsequent to the Norman conquest. East of the mount is a large area, or place of arms, three hundred feet square. The mount is about one hundred feet in height, and one hundred and eighty-four feet in circumference, at the base. The slope is extremely steep; and yet no traces remain of any path or steps for the purpose of carrying up machines or weighty ammunition.

In the Conqueror's time, Herfaft having removed the episcopal fee from North Elmham to Thetford, the latter became the head of the East Anglian diocfe; but in the succeeding reign, the fee was transferred to Norwich. The ruins of ecclesiastical and other buildings strongly point out the ancient splendour of this town. At one period it is said to have had twenty churches, answerable to the number of parishes, and eight monasteries, besides other religious and charitable foundations. But of these, the names only of some remain; and of others, a few dilapidated walls serve
to mark their fenes. Of the twenty churches, three only are preferred; St. Peter's, and St. Cuthbert's, on the Norfolk side of the river; and St. Mary the Lea on the Suffolk side. St. Peter's, commonly called the Black church, from its being constructed chiefly of flint, consists of a chancel, nave, two aisles, and a tower. The latter was rebuilt in 1789, when a great part of the church was also re-edited. The battlements on the south side, and the buttresses, are decorated with allusive ornaments and large letters inlaid in the flint work.

The Nunney was founded by Uvius, the first abbot of St. Edmund's Bury, in the reign of king Canute; in commemoration of the number of persons who fell at Snareshill, near this town, in the fangunary conflict between king Edmund's army and the forces under the Danish leaders Ingwar and Ubba. A few monks were placed in this monastery, which was then considered as a cell to Bury Abbey. In the year 1176, the monks, being reduced to two, renounced, by the request of the abbot of Bury, who placed in their hand a convent of nuns, who had previously reided at Lynn. At the dissolution, the revenues and feite were granted to sir Richard Fulmerston, who made this house his residence. It was afterwards let to a farmer, and some years since the greater part was taken down: a new farm-house was built of the materials, and the conventual church converted into a barn. Some of the walls, with buttresses, windows, &c. still remain.

The Priory or Abbey was founded by Roger Bigod, in the year 1104, for monks of the Cluniac order. This was a peculiarly privileged house; for other Cluniac monasteries were subject to have their revenues feized, on a war breaking out between England and France, because being dependent on the abbey of Cluny, in Burgundy, the monks were considered as foreigners; but the religious persons of this monastery were naturalized, and treated as other subjects of the realm. At the suppression the revenues were granted to the duke of Norfolk, and are now the property of Lord Petre. The ancient gateway, constructed with freestone and black flint, with parts of the church, &c. still remain. This monastery had been the burial-place of the several noble families who had successively borne the title of earls of Norfolk.

St. Albin's Priory was founded by John of Gaunt, duke of Lancaster, in the year 1387, for friars mendicant of the Augustinian order. The feite, granted to sir Richard Fulmerston, is still called the Friar's Close.

The Monastery of St. Sepulchre was founded in 1169, by William, earl of Warren and Surrey, for canons of the Augustinian order, and additionally endowed by king Henry II. The feite is still called Canons: part of the conventual buildings, yet standing, has long since been used as a barn. The gate of the porter's lodge, and some other parts of the buildings, remain. Of the other four religious houses, no vestiges are now left. In the Suffolk part of the town, near St. Mary's church, is a free grammar-school. In the year 1566, sir Richard Fulmerston bequeathed property for the erection of a free school, with dwelling-houses and salaries for a master and usher; and also habitations and weekly penions for two poor men and two poor women. The benevolent design of the donor, however, was not carried into effect till the time of James I., when it was enacted by authority of parliament, that there should be for ever a free grammar-school and hospital; and that the master, usher, and the four poor people, should be a body politic, under the title of "The master and fellows of the school and hospital at Thetford, founded by king James the First, according to the will of sir Richard Fulmerston, kat."

Thetford, though a very ancient burgh, is comparatively a modern corporation. In the time of the Conqueror, the town was governed by a confid and other inferior officers. Not being a free burgh, it suffered greatly at times by the oppression of the officers nominated by the crown. But in the year 1573, queen Elizabeth granted a charter, by which a mayor, ten aldermen, twenty common-councilmen, a recorder, town-clerk, sword-bearer, and two ffejants at mace, constituted the corporation. The mayor for the time being is clerk of the market, and in the year after his mayoralty officiates as coroner. The corporation had also permission to lend two burgesse to parliament, "provided they were discreet and honest men, and were elected at the expense of the borough." This charter was surrendered to the crown in the thirty-fourth year of Charles II., and a very imperfect one obtained in its stead. But in 1602 an order was procured from the court of chancery for cancelling the surrender, and procuring a transcript of the charter granted by Elizabeth, under which the town is at present governed. Thetford has been honoured with the presence of many of our sovereigns, particularly Henry I. and II. Several charters, granted by the former, bear date from this town. When the manor fell with the duchy of Lancaster, of which it formed a parcel, to the crown, the ancient seat of the earls Warren became the royal palace. This was rebuilt in the time of queen Elizabeth, who occasionally resided here. King James I. made it one of his hunting seats; but being disgraced with the abrupt remonstrance of a farmer, over whose lands he had been hunting, he gave the palace to Sir Philip Wodehouse. It has been rebuilt, and is now the property of a private gentleman; but still bears the appellation of the "King's House." The old guildhall or council-house being in a dilapidated condition, Sir Joseph Williamson, secretary of state to king Charles II., erected at his own expense the present council-chamber, and the apartment for the juries. Thetford has been much improved within the last twenty years. A new bridge has been built, the principal street paved, and several handsome houses have been erected. The navigation of the river has been attended to, and by this communication some mercantile burthens are transferred in the corn and coal trade. Five fairs are held annually, and a market weekly on Saturdays; but, compared with its former greatness, it is now a very inconsiderable place. The population in the return of the year 1811, was rated to be 2450, occupying 530 houses.

Near to Thetford is a mineral spring, the waters of which possesses considerable virtues, though their celebrity has by no means been commensurate with their acknowledged efficacy. Thomas Paine, well known for his political and theological tracts, was a native of this town, and received his education in the grammar-school. — Blomfield's "Topographical History of Norfolk, vol. ii. Beauties of England and Wales, vol. xi. by John Britton, F.S.A. History, &c. of Thetford, by Thomas Martin, 410.

Thetford, a town of the United States, in the county of Orange, Vermont; 10 miles N. of Hanover; containing 1735 inhabitants.

THETIS, in Mythology, the name of the most beautiful of the Nereids.

THEVACOURCHY, in Geography, a town of Hindoojan, in the Carnatic; 20 miles W.S.W. of Tiragar.

THEUDORIA, in Ancient Geography, a town of Achaia, from which the Macedonians were driven by the Romans.

THEUDURUM, a town of Lower Germany, on the route
route from Colonia Trajana to Colonia Agrippina, between Mederiacum and Coriovaum. Anton. Itin. THEVEN, in Geography, a town of Peria, in the province of Laridam; 40 miles E. of Lar.

THEVENARD, Gabriel Vincent, of Paris, in Biography, born in 1669, became in the operas of Lulli the first singer and actor of his time. He had a tenor voice, which made the public forget that of Beaumarchais; it was famous, mellifluous, and extensive in compass. He sung a little through the throat, but by dint of art, he found the means of rendering this little defect even agreeable. His appearance on the stage was dignified, and his performance wonderful! It was to him that the present manner (1780) of speaking recitative is due. He excelled above all in singing at table; nor has he ever been surpassed in that talent, except by De Château and Jehote, who in many years delighted their friends.

He sung more than forty years at the Opera, and only retired in the year 1730. He was more than sixty years old, when, seeing a beautiful female slippers in a shoemaker's shop, he fell violently in love, unhappily, unseen, with the perfon for whom it was made; and having discovered the lady, married her, after obtaining the consent of an uncle on whom she was dependent, with the assistance of many bottles of wine which they cracked together with the utmost cordiality, and which Thevenard mollified with the charms of his voice.

He died at Paris in 1741, at the age of 72. Thevenard was the cause of the duke d'Antin quitting the management of the opera. This singer having a penfion offered him for his services, found it too considerable, that he refused to accept of it, saying it was only fit for his footman. The duke, piqued at this insolence, would have sent him to prison; but it having been represented to him that the public would suffer by his absence, he sacrificed to this consideration his resentment; but determining to have nothing more to do with such people, he quitted the superintendence of the opera. Laborde.

THEVENOT, John, a traveller in the Levant, was born in Lorraine, and after repeated journeys, died in Peria in 1667. He is said to have introduced the use of coffee into France. His "Voyage in Asia" was published in 1664, which is a work considerably enlarged, and has been often re-edited. The Amsterdam edition in 12mo., 1727, is comprised in 5 vols. Nouv. Dict. Hilar.

THEVENOT, Nicholas Melchisedec, a writer of travels, was born in 1621, probably at Paris, and having finished his studies, indulged his propensities for visiting foreign countries, confining himself chiefly to various parts of Europe. Some perfons have given him the credit of being a great linguist, but this is disputed by Huet, who was personally acquainted with him. The result of his observations and inquiries was published in a "Collection of Voyages and Travels," comprised in 4 vols. fol. from 1663 to 1672. Thevenot was a great collector of books, consisting of more than 2000 volumes, in which the royal library, of which he was keeper, was deficient. Nothiel, on returning from his embassy to Constantinople, enriched this collection by a present of his marbles, inscriptions, and bas-reliefs. He died in 1692. From various MSS. in the royal library, he had compiled "The Works of Ancient Mathematicians," an edition of which was published after his death. Moreri.

Huet.

THEVET, Andrew, a traveller and writer, was born at Angouleme in 1502; and being devious of visiting foreign countries, he obtained, by the interest of the cardinal of Lorraine, an opportunity of going to Jerusalem. His travels in the Levant occupied him from 1549 to 1554; and after his return to France, he accompanied the fieur de Villegaignon, in 1555, to found a colony in Brazil. In 1556 he took the habit of an ecclesiastic, and was appointed almoner to queen Catharine de Medici. He also obtained the titles of historiographer and cosmographer royal, and died at Paris in 1570, at the advanced age of 88 years. Besides other works, he published "Cosmographie du Levant," 1554, 4to.; "Les Singularitez de la France Antartique," 1588, 4to.; and "Cosmographie Universelle," 2 vols. fol. 1575; but unfortunately his veracity is questionable. Moreri.

THEVESTE, Tiffeine, in Ancient Geography, a town of Africa, situated on a delightful plain in the interior of the country, on the banks of a river, E. of Sigus, and E.S.E. of Cirta. In Anton. Itin. this town has the title of a Roman colony, and is placed on the route from Carthage to Cariaca, between Annemata Colonia and Attaba. Thevet. See Tisse.

THEVETIA, in Botany, a name given by Linnaeus, in his Hortus Cliffortianus 55, to a genus distinguished by Plu- tier, and other authors, under the American appellation of Abouai. The person commemorated by the above name was Andre Thevet, a French monk, who travelled to Brail, of which he published an account in 1554, under the title of Les Singularitez de la France Antartique, autrement nommes Americi, &e. Of this book there are several editions, with rude wooden cuts, and some accounts of plants, amongst which the Abouai is, for the first time, described. The author, according to De Theis, died in 1592, about the age of eighty-eight. Haller says he has injudiciously applied passages in the writings of the ancients to the productions of the new world; and that he has described many countries which he never visited. Linnaeus himself appears not to have been satisfied with the honour he was conferring on him, as he should not be displeased with any person who might change this name for another. He subsequently retained it as a specific name only, when the genus in question was funk in his own Ceberea. See that article.

THEU-PROSOPON, in Ancient Geography, a promontory of Phœnicia, between Tripolis and Botrys. Metc. calls it Euprostonan.

THEURGY, theurgy, a name which the ancients gave to that facer part of magic which we sometimes call white magic, or the white art.

The word is formed from θεος, god, and τερας, work; q. d. the art of doing divine things, or things which God alone can do: or the power of working extraordinary and supernatural things, by invoking the names of God, saints, angels, &c.

Accordingly, those who have written of magic in the general, divide it into three parts: the first of which is called theurgy, as operating by divine or celestial means; the second, natural magic, performed by the powers of nature; and the third, necromancy, which proceeds by invoking demons.

This theurgy, or pretended art of fo purging and refining that faculty of the mind, which receives the images of things, as to render it capable of perceiving the demons, and of performing many marvellous things by their aid, was adopted by the disciples of Ammonius towards the close of the second century. Ammonius, the founder of the sect of modern Platonists (see Platonism), with a view of reconciling the popular religions of different countries, and particularly the Christian, with his own system, turned into mere allegory the whole history of the gods, and maintained that those beings, whom the priests and people dignified with this title,
The songs of this prince are placed by some at the head of those that have been preferred in the French language, as those by Guillaume IX., duke of Aquitaine, are in that of Provence. There were indeed songs written in both languages before these princes had done poetry the honour to make it their favourite amusement; but the chief part of those of higher antiquity than the time of these patriarchs of Provencal and French verification are either lost, or thought of little value.

This prince was contemporary with Philip Augustus, and Lewis VIII. and IX., who left him as prince he accompanied to the Holy War. It has been said by several historians that he was much captivated by the charms of queen Blanche of Castile, mother of St. Lewis, to whom many of his songs were addressed; but this point of history has been disputed with great zeal by M. P. Eveque de la Ravalliere, editor of Thibault’s poems, which he published in 1742, with notes, in 2 vols. 12mo. and a history of the revolutions, in the French language, from the time of Charlemagne to that of St. Lewis, together with an Effay on the Antiquity of French Songs. This learned prelate has defended the honour of queen Blanche with his pen, five hundred years after her decease, as much proof and true chivalry, as the most valiant champion of injured innocence could have done with his sword and lance, he has been animated by the presence of that prince, and the heroism of the times in which he lived.

"Les Grandes Chroniques de France" tell us that Thibault, at the age of thirty-five, having conceived a violent and hopeless passion for queen Blanche, was advised by wise and prudent counsellors to apply himself to music and poetry, which he did with such success, that he produced "the most beautiful songs and melodies that have ever been heard."

Fauchet Des Anciens Poetes Francois.

Two airs by Thibault may be seen in Burney’s General History of Music, from the Vatican collection of Provencal floggs in Gregorian notes, without bars or bafe; and given afterwards in modern notation, with a base, and an English version of the words.

Thiberville, in Geography, a town of France, in the department of the Eure; 9 miles E. of Lieux.

Thibet, or Tibet, pronounced Tibeet and Thti in Bengal, and called by its own inhabitants Pu, or P'k, kachin, p'k signifying northern, and kachin, faxow, that is, the snowy region of the North, is a country of Asia, of which our knowledge, principally obtained at a very recent period, is still very imperfect. We have no evidence that the ancients ever penetrated the snowy mountains of Tibet. It seems to have been in some measure discofled to the Portuguese, in their commercial intercourse with the East Indies; and the name of it was known to Marco Polo and other travellers of the 12th and 13th centuries. Accordingly, Tibet seems to have been the southern part of their Tangut. Paolo indeed describes the province of “Tebeth,” as containing eight kingdoms, with many cities and villages, and as being a mountainous country, which produced some gold and spices, a large breed of dogs, and excellent falcons. But we have no geographical nor statistical account of this country upon which we can depend previously to the last century; and even now our knowledge of it is very partial and defective. About the year 1715, the emperor of China, as we learn from Du Halde, being desirous of obtaining a map of Tibet, sent two lamas, who had studied geometry, for this purpose. These lamas drew a map, from Sining, in the province of Shen-fu, to the sources of the Ganges, which was afterwards examined by the Jesuits, and improved. This map is published in the Atlas of Du Halde, and has been followed, with few variations, by our modern geographers.
THIBET.

Its authority is doubtful, its accuracy very dubious, and the information it affords concerning kingdoms, states, and provinces, as well as particular places, very limited and unsatisfactory. According to our most recent maps, Tibet extends from about the 77th to the 101st degree of longitude, which, in the latitude of 35°, may be about 1350 geographical miles. The breadth may be regarded as extending from the 25th to the 35th degree of latitude, or about 480 geographical miles. It appears, however, from the testimonies of two intelligent travellers, Mr. Forster and Tiefenthaler, that the northern boundary of Tibet may be safely extended two degrees farther than it appears in our best maps, in which there is no portion of Great Tibet to the N.E. of Cashmir. Major Rennell moved it one degree farther to the north than D’Anville’s boundary in lat. 34°, and Pinkerton thinks that he might safely have extended it at least 3°. The northern boundary of Tibet, according to the French, is Mus Tag, and they place that range in 38°. By adding 2° to 3°, we ascertain an addition of 120 geographical miles to the number of 480 above stated.

Tibet, according to Mr. Bogle’s account (Phil. Transt.), begins properly from the top of the great ridge of the Caucasus, and extends from thence in breadth to the confines of Great Tartary, and perhaps to the dominions of the Russian empire. He says, that having once attained the summit of the Bootan mountains, you do not descend in an equal proportion on the side of Tibet; but continuing still on a very elevated base, you traverse valleys which are wider and not so deep as the former, and mountains that are neither so steep, nor apparently so high. On the other hand, it represents itself as the most horticultural and delightful country he ever saw; and the climate as extremely severe. According to Mr. Turner, the boundaries of Tibet and Bootan are separated by the lofty range of mountains called Soomoonang, and are marked by a long row of white inconstant flags, fixed in rude heaps of stones, and fluttering in the wind. There, at the same time, are supposed to operate as a charm over the Dewtas, or “genii loci,” who are paramount here. No mountain is thought to be wholly exempt from their influence; and they range chiefly in the most elevated regions, where, drenched with dews, and covered with snow and snow, they are supposed to dwell among them, in ill humour, their most benevolent spells, to harass and annoy the traveller.

Tibet is sometimes divided into three parts, viz. Upper, Middle, and Lower. Upper Tibet comprehends chiefly the province of Nagari, abounding with tremendous rocks and mountains, always covered with snow. The countries of Lata or Ladak (Latac) and Bregnout or Bramasion (perhaps Sinagour) probably constitute a portion of Upper Tibet, as well as Nagari. Middle Tibet contains the provinces of Shang, Ou, and Kang; and those of Lower Tibet are Takto, Congbo, and Kagang. Many of these provinces are again subdivided: e.g. Nagari, which is considered as a kingdom consisting of three departments, Sanghar, Touroang, and Tamo (Dam or Daum). Shang is on the W. bounded by Nepal. The province of Ou contains Laharfa or Laffa, the capital of Tibet. Kang lies to the N. (or N.E.) of Ou, and is inhabited by a mixture of Tibetans and Mongols in tents. Kangang is on the S.E. bordering on the Birmanis, and is divided into twelve departments. To these we must add the wide region of Amdo, if it be not the same with Kangang, the natives of which speak the Chinese language. The country of Hor lies between Tartary and the provinces of Nagari and Kang, and seems to be the Hohonor of our maps. Our Bootan (which fee) is called by the natives Dope or Takto; and the countries W. of it, viz. Moringa or Morung, Mocampour, Nepul, Gora, and Kamaon, are not considered as parts of Tibet. On the western side, high mountains, covered with perpetual snow, and terrible avalanches, have prevented the access and invasions of the Persians and the conquerors of Bucharia; while the deferts on the N.E. have proved ineffectual barriers against the Monguls and Eluta. Travellers have also been prevented from exploring this quarter by the western mountains, so that it is even now little known.

According to the topography, compiled from the papers of Pinnebull, a Capuchin friar, who died in 1747, and was buried at Patan, by father Giorgi, in a work published at Rome in 1762, Tibet is bounded on the E. by China and Tartary, a province abounding with tea, and, since the year 1720, incorporated with the Chinee empire; on the S. by Bengal, Lofice, Altibuxy, Mou, Bruckps, Lhoba, Lhoka, Krapa, Sciapado, and Bha; on the N. by Casmir, Nekpul, and Moronga; and on the N. by Great Tartary, the Ulheba, Cash, and Janzkar, as far as Zerkend and Cokonor or Kokonor. The kingdoms and provinces in this topography are enumerated by Pinkerton, ubi infra.

The government of Tibet has been considered as ecclesiastical or spiritual; though the lamas were accustomed to appoint a “tip,” or secular regent, a right which has been probably transferred to the Chinee emperor. This officer resides at Laffa, the capital, and is invested with the government and supreme control over the whole country. Mr. Turner, however, is of opinion, that the temporal authority of the lamas may again recover its former dignity and splendour. Bootan, which is generally considered as a feudatory province of Tibet, has a raja or prince called Daib, of no very permanent or extensive authority. The laws must, like the religion, bear some affinity to those of the Hindoos.

The lama of Tibet was the Prester John of the middle ages, if we were not some Nefferian khan; and the appellation was unaccountably transferred by Portuguese ignorance to the emperor of Abyssinia. (See Prester John.) In the time of Marco Polo, Tibet, having been ravaged by the Monguls, was almost depopulated. For some time this country had been subject to secular kings, called Tien Pa; and the lama resided at Laffa, with a power resembling that of the spiritual prince of Japan. According to Giorgi, the consecration of kings and lamas commences about 1340 years B.C. but about 1100 years after Chrift the Chinee emperor gave to a celebrated lama the regal power. These Monguls, called Elet, conquered the secular prince, and transferred the whole power to the lama. (See Du Halde, iv. 50.) In 1792, the Napoleons, having committed great ravages in Tibet, the Chinee emperor sent an army to protect the lama; in consequence of which the Chinee established military posts on the frontiers, so that the intercourse between their country and Bengal is now precluded. The revenues of the lama and of the secular princes are trifling; nor is it likely that Tibet can ever aspire to any political importance.

Some have said, that the religion of Tibet is a corrupted Chritianity; and even father Dienderli, a Jesuit, who visited the country about the beginning of the last century, thinks he can resolve all their mysteries into ours; and he afferts that they have a good notion of the Trinity, since, in their address to the Deity, they say as often kowick-oik in the plural, as kowiek in the singular, and with their explanations pronounce these words, Om, Ha, Hum. Of these whimsical conjectures we shall say no more, but pass on to observe, that the religion of the Tibetans seems to have derived its origin, says Turner, (ubi infra,) from a disciple of Budh, who first broached the doctrine which now prevails over the wide extent of Tartary. It is reported to have received its earliest admission
admission in that part of Tibet bordering upon India, (which
from hence became the seat of the sovereign lamas,) to have
traversed over Manchow Tartary, and to have been ulti-
mately diffeminated over China and Japan. Though it dif-
fers from the Hindu in many of its outward forms, yet it
still bears a very close affinity with the religion of Brahma in
many important particulars. The principal idol in the temples
of Tibet is Mahamoonie, the Budha of Bengal, who is
worshipped under the and various other epithets through-
out the great extent of Tartary, and among all the nations to
the eastward of the Berampooter. In the wide extended
space over which this faith prevails, the fame object of
veneration is acknowledged under numerous titles; among others,
he is styled Godam or Gowtama, in Affam and Ava; Sa-
manu, in Siam; Anida Buth, in Japan; Fobi, in China;
Budha and Shakamuna, in Bengal and Hindoostan; Dharma
Raja and Mahamoonie, in Bootan and Tibet. Durga and
Kali; Ganeif, the emblem of wildom; and Cartikcâh, with
his numerous heads and arms, as well as many other deities of
the Hindu mythology, have also a place in their affemblage
of gods.
The fame places of popular esteem or religious refor,
are equally respected in Tibet and in Bengal; Prâaç, Calhi,
Durgeedon, Sâugar, and Jagarnaut, are objects of devout pil-
grimage; and loads of the sacred water taken from the Ganges,
have been seen travelling over these mountains, (which, by the
bye, contribute largely to its increafe,) upon the shoulders of
men, whom enthuilats have deemed it worth their while to
hire at a considerable expense for fo pious a purpoze.
As far as can be judged respecting their ritual or ce-
monial worship, it differs materially from the Hindu.
The Tibetians affemble in chapels, and unite together in
prodigious numbers, to perform their religious service, which
they chant in alternate recitative and chorus, accompanied by
an extensive band of loud and powerful instruments. So that,
whenever these congregations were heard, they forcibly re-
called to remembrance, both the solemnity and found of the
Roman Catholic mafs.
The instruments made use of were all of an enormous size.
Trumpets above fix feet long; drums stretched over a cop-
per cauldron, such as are termed novabut in Hindoostan; the
gong, a circular Chinese instrumt of thin hammered bell-
metal, capable of producing a surprifing sound; cymbals,
lautboys; and a double drum, shallow, but of great circum-
ference, mounted upon a tall, slender pedetall, which the
performer turns with great facility, striking either fide with
a long curved iron, as the piece requires a higher or a lower
note: these, together with the human tibia, and fcea-conch, a
large species of the buccinum, compofe, for the most part,
their religious band. Harfii as these instrumts, individually
taken, might found to a musical ear, yet when joined toget-
er in union with the voices of two or three hundred boys
and men, managed with varying modulation, from the loweft
and fowteft cadence to the loudeft swell, they produce to the
ear an effect extremely grand.
Other musical instrumts are in the hands of the people
of Tibet.
Among the Tibetians, says Mr. Turner, all is fyllem and
order. The mind readily obeys the superiority it has been
acquainted to acknowledge. A sovereign lama, immaculate,
immortail, omniprefent, and omnifcient, is placed at the fun-
mitt of their fabric. He is esteemed the vicegerent of the
only God, the mediator between mortals and the supreme.
They view him only in the most amiable light, as per-
petually absorbed in religious duty; and, when called to be-
low attention on mortal beings, as employed only in the be-
ign office of diatributing comfort and consolation by his
blessing, and in exercising the firit of all attributes, forgiver-
nels and mercy. He is also the centre of all civil govern-
ment, which derives from his authority all its influence and
power. At the fame time that he is the soul which animates
their whole fyllem, a regular gradation, from the moft ven-
nerated lama, through the whole order of Gylongs to the
young novicate, is observed with rigid ferverity.
The inferior gradations from the prefident of a monaftery,
who is always ifyled lama, in addition to the name of the
fitation to which he belongs, are Gylong, Tobba, and
Tuppa. See GYLONG, TEOHO-LOOMBOO, TOHBA, and
TUPPA.
The nation is divided into two distinct and separate claffes,
thofe who carry on the businefs of the world, and thofe who
hold intercourfe with heaven. No influence of the lafter
ever interrupts the regulated duties of the clergy. The
latter, by mutual compaét, take charge of all their spiritual
concerns; and the former, by their labours enrich and pop-
ulate the flat.
In Tibet there are two fects, distinguished by the appella-
tions of Gylloopka and Shammar, but the external appear-
ance, or drefs of both, is fimilar, except the diftinction
in the colour of the cap; the Gylloopka having adopted
yellow, the Shammar red; a circumstance which is
ftrictly attended to, on all occafions of ceremony. Three
lamas are placed at the head of each fect; Dalai lama,
Tefhoo lama, and Taranatu lama, prefide over the Gyl-
loopka, who have their refidence at Pootahal, Tefho-
loomboo, and Kharka. This fect prevails over the greatest
part of Tibet, and a division of the fame is faid to be esta-
blifhed in a province of the Decan, called Seurra or Serrora.
In like manner, three lamas also, lam' Rimbochay, lam'
Sobroo Nawangnamghi, and lam' Ghaffartoo, prefide over the
Shammar; these have their refidence in Bootan, in separate
monaftries, but, from the limited extent of that country,
at no great distance from each other. The principal of the
Shammar fect in Tibet is ifyled Gongfo Rimbochay, and
has his refidence at Sakia.
The Tibetians are actuated by an ardent spirit of devo-
tion; and they attribute the merit of every thing great,
or singularly beneficial, to the agency of some supernatural
being. It is the cuftom in Tibet to preferve entire the
mortal remains of their sovereign Lama only; every other
corps is either confumed by fire, or given to the promif-
cious food of beasts and birds of prey. As soon as life has
left the body of the Lama, it is placed upright, fittin
in an attitude of devotion, the legs being folded before him,
with the infep reaching upon each thigh, and the foles of
the feet turned upwards. It is the practice here to cover
the bodies of men, found dead in the fields, with cloths of
earth, which the rains gradually diffolve and incorporate,
forming the loofe mafs into a compact hillock. This
always attracts the fame refpect, and passengers continue to
add to the heap, long after all traces of the body are,lolft,
and its exiftence forgotten. Thus also the piety of the
Tibetians offers a fimilar rite to the bodies of thofe
whom chance may have led to the fpot, where the fragmen-
lay at the infant of its fall, though the fatal effects of it
may not have been certainly known.
A tribute of refpect is paid, in this region, to the manes
of the dead in various ways. The sovereign lamas are devo-
fited entire, in shrines prepared for their remains, which
ever after are looked upon as sacred, and visited with reli-
gious awe. The bodies of inferior lamas are usufally burnt,
and their ashes preferred with great care in little metallic
idols, which have places affigned them in their facred
ofbines. Common fubjects are treated with left cere-
mony;
fome have been incorruptible; but conformable to the usual declaration. This last, but less frequent, mode of disposing of the dead, is committing them to the waters of the river. Burial, that is, inhuming the corpse entire in the earth, is altogether unpractised.

On one side of this monastery of Tshul-po Loomboo is the place to which they convey their dead. It is a spacious area, enclosed on one part by a perpendicular rock, and on the others by lofty walls, raised probably with a view to exclude, from public observation, the disgustful objects contained within. At the top it was totally uncovered, so as to be perfectly open to the birds; and at the bottom a narrow passage was left through the walls, near their foundation, for the sole purpose of admitting dogs, or other beasts of prey. On the rock above, a platform overhung the inclosure, which had been contrived for the convenience of precipitating the dead bodies with greater ease, over the walls, into the area. And here, the only rites performed, in honour of the dead, were merely such as tended to facilitate the destruction of the body by dogs or birds of prey. But though this was the general receptacle, yet there were fome who declined the use of it, and conveyed their friends to the summit of some neighbouring hill, where they disjoined and mangled the dead body, that it might become a more easy prey to carnivorous birds. Hence it was concluded that there was a strong prejudice in their minds of some idea of pollution attached to "being given to the dogs," which was sufficient to create a preference of the contrary practice.

In Tibet, as well as in Bengal, an annual festival is kept in honour of the dead.

The Tibetans are much addicted to superstition; and accordingly they lay great stress on lucky and unlucky days. They also pay great respect to the professors of astrology. Hence we find no prudent traveller ever attempting to undertake a journey, without previously appealing to this authority, and endeavouring to obtain an auspicious preface. The fame signal of favour is deemed indispensably requisite in every important enterprise, and the fame wary circumlocution enters equally into all the more minute concerns of domestic life. The union of the sexes, and the giving names to infants, are neither of them events to be accomplished without a regular appeal to the fame decisive oracle. This science is also regarded in the contruction of their almanacs. Their year, which is lunar, consists of 12 months, each month having 29 days; and the days are reckoned from the appearance of the new moon, in regular succession, till it shews itself again. The parts of the days are, evening, night, morning, and noon; and their computation of time is conformable to the general practice of the East, by a cycle of 12 years. The art of printing is said to have been very anciently practised in Tibet; but it has hitherto been principally appropriated to sacred works, and to the service of learning and religion. Their books are printed with blocks of wood, on narrow slips of thin paper, fabricated from the fibrous root of a small shrub. The printed and written letters appropriated to works of learning and religion, are called "uchen"; and those of bufinses and correspondence are called "umin." The Gyangs, or priests, pass through a regular education. As for the language of Tibet, its origin is not satisfactorily ascertained. Du Halde reports, that it is the same with that spoken by the people of Sifan, on the frontiers of China; but as this province is sometimes included in Tibet, this information is vague and indeterminate. Their characters, says Sir William Jones, are apparently Indian, but their language has now the disadvantage of being written with more letters than are ever pronounced; for, although it was anciently Sanscrit and polysyllabic, it seems at present, from the influence of Chinese manners, to consist of monosyllables, to form which, with some regard to grammatical derivation, it has become necessary to suppress, in common discourse, many letters which we see in their books; and thus we are enabled to trace in their writings a number of Sanscrit words and phrases, which, in their spoken dialect, are quite undistinguishable.

A singular custom prevails in this country, which may be called polyandry. One female associates her fate and fortune with all the brethren of a family, without any restriction of age or of numbers. The choice of a wife is the privilege of the elder brother; and it is said, that a Tibetan wife is as jealous of her consanguineous, though thus joined to a numerous party of husbands, as the defpot of an Indian zemina is of the favours of his imprisoned fair. The bufinses of propagating the species is abandoned to mere plebeians; and marriage seems to be considered rather as an odium and a burden. The influence of this custom on the manners of the people is not found to be unfavourable. Humanity and gentleness of disposition are the concomitant inheritance of a Tibetan. Mr. Turner says that he never saw the quality polliated by any people in a more eminent degree. Without being very officious, they are always obliging; the higher ranks are unassuming; the inferior, respectul in their behaviour; nor are they at all deficient in attention to the female sex; but, as we find them moderate in all their passions in this respect, also their conduct is equally remote from rudenes and adulation. Comparatively with their southern neighbours, the women of Tibet enjoy an elevated station in society. To the privileges of unbounded liberty, the wife here adds the character of mistress of the family, and companion of her husbands. The company of all, indeed, he is not at all entertaining to expect. Different pursuits, either agricultural employment or mercantile speculation, may occasionally caufe the temporary absence of each; yet whatever be the result, the profit of the labourer flows into the common trea; and when he returns, whatever may have been his fortune, he is feer of a grateful welcome to a sociaal home. The men are generally stout, having in a degree the Tartar features, and the women are of a ruddy brown complexion, heightened like the fruits by the proximity of the sun, while the mountain breezes bestow health and vigour.

The ceremonies of marriage are neither tedious nor intri- cate in Tibet. Their courthips are carried on with little art, and quickly brought to a conclusion. The elder brother of a family, to whom the choice belongs, when en- couraged of a damsel, makes his proposal to the parents. If his suit is approved, and the offer accepted, the parents, with their daughter, repair to the tutor's house, where the male and female acquaintance of both parties meet and carouse for the space of three days, with music, dancing, and every kind of festivity. At the expiration of this time the marriage is complete.

Tibet is thinly peopled with inhabitants, on account of its mountainous surface and the severity of its climate; nor can any accurate estimate be made of its population. From some circumstances it has been conjectured, that upon the whole it cannot be less than half a million. Giorgi, indeed, or rather Pinzabilla, from whom he deduces his statement, computes the number of inhabitants in 1730 at 33 millions, and the soldiers at 690,000; but both these numbers are most extravagantly exaggerated; for Tibet has been
been often conquered by the Chinese with armies not exceeding 40,000 men. The singular custom of polyandry, already mentioned, seems adapted to check the progress of population, the superabundance of which, in an infertile country like Tibet, would be one of the greatest calamities, as it must produce internal warfare or internal want.

Bootan and Tibet exhibit a very remarkable contrast in their external appearance. Bootan presents to the view nothing but the most mis-shapen irregularities; mountains covered with eternal verdure, and rich with abundant forests of large and lofty trees. Almost every favourable aspect of them, coated with the smallest quantity of soil, is cleared and adapted to cultivation, by being shovelled into horizontal beds; not a slope or narrow slip of land between the ridges lies unimproved. There is scarcely a mountain, whose base is not washed by some rapid torrent, and many of the loftiest bear populous villages, amidst orchards and other plantations, on their summits and on their sides. It combines in its extent the most extravagant traits of rude nature and laborious art.

Tibet, on the other hand, strikes a traveller, at first sight, as one of the least favoured countries under heaven, and appears to be in a great measure incapable of culture. It exhibits only low rocky hills, without any visible vegetation, or extensive arid plains, both of the most stern and stubborn aspect, promising as little as they produce. Its climate is cold and bleak in the extreme, from the severe effects of which the inhabitants are obliged to seek refuge in sheltered valleys and hollows, or amidst the warmest aspects of the rocks. Yet perhaps Providence, in its impartial distribution of blessings, has bestowed on each country a tolerably equal share. The advantages that one poises in fertility, and in the richness of its forests and its fruits, are amply counterbalanced in the other by its multitudinous flocks and invaluable mines. As one seems to poise the pabulum of vegetable, in the other we find a superabundance of animal, life. The variety and quantity of wild fowl, game, and beasts of prey, flocks, droves, and herds in Tibet, are astonishing. In Bootan, except domestic creatures, nothing of the fort is seen. It has been asserted that Tibet was, in remote times, almost totally inundated; and the removal of the waters that covered its surface is ascribed to the miraculous interposition of some object of their worship, whose chief temple is reported to be at Dungceedin, Gya. In this traditionary belief we may possibly discover some traces of the universal deluge; though the tradition be obscured by fable and disfigured by a mixture of absurdity. In the temperature of the fowons in Tibet, a remarkable uniformity prevails, as well as in their periodical duration and return. The same division of them takes place here, as in the more southern region of Bengal. The spring is marked from March to May, by a variable atmosphere; heat, thunder-showers, and occasionally with refreshing showers. From June to September is the season of humidity, when heavy and continued rains fill the rivers to their brim, which run off from hence with rapidity, to aflift in inundating Bengal. From October to March, a clear and uniform sky succeeds, seldom obscured either by fogs or clouds. For three months of this seafon, a degree of cold is felt, far greater perhaps than is known to prevail in Europe. Its extreme severity is more particularly confined to the southern boundary of Tibet, near that elevated range of mountains which divides it from Affam, Bootan, and Nipal.15 The summits of these are covered all the year with snow, and their vicinity is remarkable, at all seafons, for the dryness of the winds. The range is confined between the twenty-sixth and twenty-seventh degrees of northern latitude. During the winter, a practice is adopted in the neighbourhood of these mountains, similar to that in use in the coldest parts of North America, but in some respects more complete. It is that of preparing meat and fish for carriage, by the action of extreme cold. This practice, however, seems to be confined to the preparation of mutton alone, which is a very simple process, and requiring no ufe of salt. The Tibetians generally use that which is recently killed in a raw state, without any previous cookery.

Among the valuable and useful animals of Tibet, which are musk-deer, hares of a small size, goats yielding the hair that is manufactured into shawls, and cattle that are diminutive, to which we may refer the yak of the Tartars, their breed of sheep claims a distinguished rank. Of thee the flocks are numerous, and upon them they chiefly depend for their winter food. A peculiar species, thought to be indigenous to this climate, is marked almost invariably by black heads and legs. Their fize is small, their wool is soft, and their flesh, says Mr. Turner, is the finest mutton in the world. The wool affords material for one of their principal manufactures. (See Lhansa-jeung.) Their skins and those of the lambs are cured with the wool on, and constitute a valuable article for winter garments, and for foreign traffic.

The soil and climate of Tibet are very unfavourable to any kind of exertion and activity that have for their object the cultivation of the land; but from time immemorial it has been the resort of merchants. Commerce, however, has been very languidly encouraged. The form of government, which is arbitrary, is inimical to industry and enterprise. In Tibet, and also in Bootan, the first member of the flate is the chief merchant; and his flation and power of controul give him great advantages over the common adventurer; and of course by this monopoly of the sovereign, emulation is restrained and suppreffed.

Although, as we have said, the nature of the foil prohibits agriculture; yet the vales on the approach of winter being laid under water, they are ploughed and sown in spring, and the crops are matured by frequent showers and a powerful sun. The autumn being clear and tranquil, the harvest is long left to dry on the ground; and when sufficiently hardened is trod out by cattle. The course of cultivation is wheat, peas, and barley; rice being confined to a more southern foil. Nevertheless, the country abounds with commodities, which in different circumstances would give spirit and extent to commercial transactions, whilst they are languishing in floth, or exhibiting every indication of poverty. The trade with Bengal was formerly not inconsiderable; but this has been interrupted and diminished by the communications which have long distracted the kingdom of Nipal, which was the only known channel of communication. Bengal transmitted to Tibet, broad cloth, chiefly of inferior quality and of yellow and scarlet colours; some few trinkets, such as snuff-boxes, smelling-bottles, knives, scissors, and optic-glares; and spices, particularly cloves and nutmegs; fandal wood, pearls, emeralds, sapphires, lapis lazuli, coral, jet, amber, shells, cloth, leather, tobacco, indigo, and otter-skins; and it received from Tibet, gold-dust, musk, and tincal. The articles of trade in next importance, amongst the natural productions of Tibet, are goats’ hair and rock-salt. Bootan, Nipal, Bengal, and Hindooftan, are supplied with tincal from Tibet. The hair of the goats is carried to Cashmire, where it is manufactured into shawls. The demand for full is in the consumption of Nipal and Bootan.

The trade from Tibet to Bootan consists of gold-dust, tea,
tea, woollen cloths, and felt; from Bootan to Tibet, the articles are English broad cloth, Rungpo leather, tobacco, coarse cotton cloths, &c. paper, rice, landal wood, indigo. Tibet sends to Ludclark, the mart between Cashmir and Teshoo-Loomboo, the fine hair of goats, and receives in return gamboge, shawls, dried fruits, as apricots, raisins, currants, dates, almonds, and saffron. Khambatik sends to Tibet, horses, dromedaries, and Balgar hides. In Tibet there are several mines of lead; and as lead-ore contains silver, it might be separated from it to great advantage, if the method of doing it were known. There are also mines of cinabar, which contains a great proportion of mercury, if the Tibetans knew how to extract it. The copper-mines furnish materials for the manufacture of idols, and all the ornaments dispofed about monasteries, on which gilding is bestowed, for which there is a great demand in Tibet.

A very small quantity of specie is current in Tibet, and that is of a base standard. It is the silver coin of Nepal, here denominated indermiller, and worth about one-third of a fice rupee; and it is cut into halves, third parts, and quarters. In all mercantile transactions, however, the equivalent is made in bullion, i.e. talents of gold and silver, valued in proportion to the purity and specific gravity of the metal.

The commerce between Tibet and China is carried on principally at a garrifon town, on the western frontier of China, named Sinning, or Silling: thither merchants resort from Tibet with their manufacture; viz. a thin cloth resembling friece, but rather of a more open texture, gold-dust, and some other commodities procured from Bengal; which they exchange for tea, silver bullion, brocades, and fruit. In these articles an extensive trade is carried on; and Mr. Turner has been assured that, on the territory of Teshoo-Loomboo alone, tea, to the amount of five or six lacs of rupees, is annually consumed. From hence, too, Bootan is supplied with tea, which is in the same general use there.

Tibet exports to China, gold-dust, diamonds, pearls, coral, mufk, woollen cloths of its own manufacture, lamb-skins and otter-skins, called eel, brought from Bengal; and China returns to Tibet, gold and silver brocades, plain silk, fatins, black tees of four or five different forts, tobacco, silver bullion, quicksilver, cinabar, china ware, trumpets, cymbals, and other musical instruments; furs, viz. fable, ermine, black fox; and dried fruits of various sorts.

The regulations for carrying on the commerce of the English East India Company through the dominions of Bootan, by means of the agency of native merchants, were settled by the treaty entered into by Mr. Bogle, in the year 1775.

The cities and towns of Tibet are little known; the capital is Laffa; which fee. Among the edifices, the monasteries occupy the first elats. (See Teshoo-Loomboo.) The chief river of Tibet is Barhampoar; which fee. The Hoon-ho and Kiu-ku of the Chinese also derive their origin from the eastern boundaries of Tibet. The great Japaneke river of Cambodia, or Maykaung of Laos, that of Nou Kia, suffused to pafs near Marytan, into the gulf of Pegu, and the Irawaddy of the east country, are suffused to have their sources from the mountains of Tibet, which may be ityled the Alps of Asia. Another large river, called the Sardjo or Gagra, which, after a course of about 600 miles, nearly parallel on the E. with that of the Ganges, joins it near Chupra, and derives its fpring from the lofty western mountains of Tibet. In these Alpine regions are many lakes, as such as Tarkiri, and Jamdro or Pelte; which fee.

The ranges of Tibetan mountains in the W. and S. seem to bend in the form of a crescent, from the sources of the Ganges to the frontiers of Assam, in a N.W. and S.E. direction. To the N. of Sampo a parallel and higher ridges seems to extend, the northern extremities abounding with large frozen lakes. The chief elevation of mountains appears to be central, S. of the lake Tarkiri, and is called Koirin, the western part being denominated Kantiel. The southern range presents many names of distinct mountains, comprehended under the Hindoo name of Himmela. From these ranges many branches extend N. and S. This country posseses many mineral waters, the salutar nature of which is not unknown to the natives. Among its natural curiosities we may reckon a singular rock, N. of Taffudon, described by Mr. Saunders in the Appendix to Turner's Travels, and forming in front of seven angular semi-pillars of large circumference, and some one hundred feet in height. This natural curiosity is partly detached from the mountains, and projects over a considerable fall of water, which heightens the picturesque appearance of the whole. The rock is laminated, and might be formed into slaty; and iron-frames are found in the vicinity, these pilasters probably, like those of bafals, arise from the influence of that metal.


TIBET or THIBET, Little, a district N.W. of Cashmir, which is supposed to contain the chief fource of the Indus. The itution of this country is doubtful; it probably lies on the N. and N.W. of Cashmir, and is divided from Great Tibet by a high mountainous ridge, and by a higher chain, that of Belur, from Great Bucharia. It is described as a very mountainous and poor country, pervaded by the Indus, and towards the N. full of forests. The capital is Afeardu, and further to the N. is Schekar, Temir-kand, or the fortrefs of iron, seems to command the paths between Great and Little Tibet; and the two Ganges of the Chinefe maps (supposed fources of the Ganges) are probably rivers which join the Indus from the Laff. Pinkerton.

The delineation of the country of the Sæcs, by Ptoley and Strabo, (see SÆCE.) will be found to correfpond, says Hugh Murray, eqq. in his Ancient Geography of Central and Eastern Asia, in every refpect, with that given by Mr. Elphimstone of the Plain of Pamera and Little Thibet. It was bounded on the S. by Hindoootan, from which it was separated by the ridge of Imaus. On the N. it was bounded by the next parallel chain, Monns Afeateenas, which cannot possibly be any other than the Mooz-Tangu, to whose name, indeed, it bears a rude refemblance. It extended E. from the Montes Comedorun, (the Boloo or Belur,) to some what beyond the head of the Ganges; precisely the dimensions of Little Tibet. Great and Little Thibet form a table land of extraordinary elevation, bordering on Hindooottan to the S.; and two parallel chains, running from E. to W., prop this mighty bulwark of Asia. The northern barrier is formed by an immense chain, known under the name of Hindoo Coofii, and Himmela or Himalaya, which forms the northern limit of India. The whole extent of it is covered, to a great depth, with perpetual snow; and every measurement yet made, from Pehaur to Nepal, has made it exceed 20,000 feet above the level of the plain, being higher than the highest peaks of the Andes. The whole is recognized by Ptoley under the name of Imaus. The northern range, known by the uncouth appellation of Mooz-Tangu, taugh being merely the generic name of mountain, or Karrakorum, Mr. H. Murray apprehends to be defcribed by him under the name of Monns Afeateenas. Its absolute elevation seems to exceed that of Himalaya, and yet from the high level of its base, it does not present formidable an aspect. At right angles

Vol. XXXV.
THICKEN, in Gardening, a sort of close plantations of trees and shrubs, in pleasure-grounds, parks, &c. They are designed for different purposes, as sometimes to repel the force of tempestuous and cold cutting winds, either from the habituation, or from particular part of the garden; or to form places of shade and retirement in summer, having spaces for walks, recollections, &c. under the shade of the trees, and occasionally to conceal from view any unattractive or disagreeable object, and also sometimes to form a screen or blind arranged towards some outward boundary.

They are sometimes planted wholly of the large tree kinds, five or six to eight or ten feet asunder, some in regular lines, like a close grove, or more generally in a sort of promiscuous planting, but with some degree of order in the distances: they are also often composed of various trees and shrubs together, to effect a more full, close growth below and above, and to display a greater diversity in the plantation, by disposing the various shrubs properly between the larger trees, in some order of gradation, the lowest towards the front, and the taller growths backward, so as to form a sort of underwood thickets below, while the trees run up and form a thicketty growth above; and sometimes they are formed wholly of shrubs of different sorts and degrees of growth, from the lowest placed forward, to the tallest behind.

They are sometimes, too, formed wholly of particular sorts of trees disposed separately in distinct plantations, as of elm, ash, beech, poplar, alder, willow, &c.

The planting of thicket plantations should be effected with young trees of four, five, or six, to eight or ten feet growth, and the shrubs kinds proportionally; in which of the planting may be performed in the common seasons of autumn, winter, and spring.

In the culture of thicket plantations, little is required but that of keeping them clear from large overbearing weeds, while the trees and shrubs are in young small growth.

Thickets are now much less in use than was formerly the case in ornamental gardening, and pleasure-ground planting; they may, however, on some occasions, be introduced with good effect.

THICKON, in Geography, a river of Pennsylvania, which runs into the Delaware, N. lat. 40° 25'. W. long. 75° 5'.

THICKSTUFF, a name for fided timber exceeding four inches in thicknefs, but not being more than twelve inches in thicknefs.

THIEBLEMONT, in Geography, a town of France, in the department of the Marne; 8 miles E.S.E. of Vitry le Franciz.

THIEL, or Tilt, a city or town of Holland, in the department of Guelderland, situated on the north side of the Wahal, in a small island called Tilt-Wser. In one of its faubous, called Santwyck; which is well fortified, is a strong citadel: the fortifications were destroyed in the year 1674, by the French, who had made themselves masters of the place about two years before, and have been since repaired. In the year 1528, it was besieged by the Spaniards, when Charles V. was at war with the duke of Gueldres; but they were compelled to raise the siege, through the brave resistance of the citizens. The country about it is marvishly, and the air reckoned unwhofome. The fortifications are destroyed; 18 miles N.N.E. of Bois-le-Duc.

THIELLE, a town of the county of Neufchâtel, between the lake of Bienne and the lake of Neufchâtel; 5 miles N.E. of Neufchâtel.—Alto, a river of Switzerland, which rises in the Vaudois, passes through the lakes of Neufchâtel and Bienne, and runs into the Aar, 3 miles below Buren.

THIELLEN, a town of Switzerland, in the canton of Uri; 2 miles N.W. of Altorf.

THIET, a town of France, in the department of the Lys; 10 miles N. of Courtray.

THIÈNE, a town of Italy, in the Vicentin; 9 miles N.W. of Vicenza.

THIERS, John Baptist, in Biography, a divine, was born at Chartres about the year 1636, and became a baihelor of the Sorbonne, professor in the college of Du Plessis at Paris, and cure of Chaupre, in the diocese of Chartres. Being arrested in consequence of a dispute with the clergy of Chartres, and a dispute against one of them, he escaped by a stratagem, and found refuge with the bishop of Mans, who gave him the cure of Vibraye, where he died in February, 1703. His works are numerous, freely written, and on singular subjects; but we refer for an account of them to Moreri, the Nouv. Dift. Hiftor. and Gen. Biog.

THIERS, in Geography, a town of France, and principal place of a district, in the department of the Puy-de-Dôme; here are manufacturies of cutlery, playing-cards, paper, thread, &c.; 21 miles S.E. of Gannat. N. lat. 45° 52'. E. long. 3° 38'.

THIERSHEIM, a town of Germany, in the principality of Culmbach; 6 miles N.E. of Wonfiedel.

THIERSTEN, a town of Germany, in the principality of Culmbach, on the Egger; 5 miles N.E. of Wonfiedel.

THIE-WEY-ARA-YETH LAKE, a lake of North America. N. lat. 61° 20'. W. long. 106° 30'.

THIGH, Femur, a part of the body of men, quadrupeds, and birds, between the leg and the trunk. See Extremities.

We have an account in the Philosophical Transactions of a large piece of a young man's thigh-bone being taken out, and the place so well supplied by a callus, that he walked straight. See No. 461. feh. 2.

THIGH-Bone, Fractured. See Fracture.

THIGH, Laxation of. See Laxation.

THIGH, in the Manage. The effect of the horfeman's thigh is one of the aids that serves to make a horfe work vigorously. See Aid.

Fore-thigh, or arm of a horfe, is that part of the fore-leg that runs between the shoulder and the knee: though the fore-thigh does not bend or bow, yet we commonly say, a horfe goes fine, that bends well the fore-thigh, importing by it, that he bends well his leg.

Horses should always be full and well made in the thick parts of the thigh, especially in horses of the working kinds.

THIGHT, in Agriculture, a term provincially applied to turnip, or other crops which are thick or closely set. It also signifies impervious, when applied to roots or veillons in some districts.

THILACHIUM, in Botany, so named by Loureiro, from
from above, a little bag, alluding to the form of the calyx. It ought rather therefore to have been *Thylachium*—Loureiro. Cochinch. 342.—Claws and order, *Polyandria Monogynia*. Nat. Ord. *Caparides*, Juff.


Eff. Ch. Calyx of one leaf, oblong, burbling all round. Corolla none. Berry flaked, with ten angles, one cell, and many seeds.

1. *Th. africanum*. African Pouch-flower.—Observed by Loureiro on the eastern coast of Africa, near Mozambique, where it is called by the Portuguese *Mangueiro*. The tree is small, with spreading branches. Leaves alternate, flaked, ovate, entire, smooth. Stalks terminal, bearing several flowers, whose long filaments are of a fawn colour. The author observes that this genus approaches *Capparis*, in its flaments and the flake of its berry, but differs widely in the unusual form of the calyx, as well as the want of a corolla, and the figure of the seed-coat. De Theis thinks it allied to *Marcgravia*, see that article. As far as it is related to *Capparis*, he is right; but between the corolla of *Marcgravia*, and the calyx of *Thylachium*, which he seems to have had in view, there can be no affinity; any more than between the latter and the pouch in the outer calyx of *Rhus*, which article the reader may likewise consult. We must be content to leave the matter as we find it, there being great probability, considering how little we know of the botany of its native country, that the plant, and even its genus, are entirely new to Europeans.

**THILAY**, in Geography, a town of France, in the department of the Ardennes; 7 miles N.E. of Charleville.

**THILCHATEL**, a town of France, in the department of the Cote d'Or; 14 miles N. of Dijon.

**THILCO**, or rather *Thilco*, in Botany. See *Fuschia*, n. 9.

**THILL**, in Rural Economy, the name of the framed shafts of carts and wagons, between which the horse draws and moves. The thills of these kinds of carriages should always, as much as possible, be made of tough ash-wood, and light in proportion to the nature and uses of them.

**THILL-HORSE**, the half-horse in a team, or the horse that goes between the thills or shafts; which often sustains much undue weight and pressure on the back, in consequence of the load which is drawn. This is capable of being relieved in various ways and by different contrivances, but the two which are noticed below would seem to be the most simple and easy. It is well known to be almost universally the practice to hook or attach the second horses, in cart or wagon teams, on at the end of the shafts. The consequence of which is obviously this: whenever the cart or carriage ascends a hill, and the fore part of the team comes to level ground, which not unfrequently happens, while the thill-horse or horses are still on the declivity, from their force being exerted in a right line to the ends of the shafts, all the powers of the whole of the leading horses must, in such cases, inevitably load and oppress the thill-horse or horses, when so directed, as they tend to depress the shafts, in their exertion to draw at the proper point of draught; that is, in the line with the axle. The thill-horse or horses are often seen, in such instances, nearly borne down, where the accents are steep, and the levels rather suddenly regained. The back, or backs, of such horses become a fort of fulcrum, on which the strength of all the preceding horses acts as a kind of lever; which, if sufficiently forcible, and the thill-horse or horses' backs were strong enough to bear the pressure, must lift the carriage off the ground, until it is come to a level with the line of their pull.

In order to remedy this great prejudice and inconvenience, it is advised that a looped iron, of about a foot in depth, in the whole, be fastened to the end of the shaft; nailing and riveting it firmly, by means of expanded flats. The looped part will then reach about eight or nine inches under or below the shafts. Each trace is to be carried through these loops instead of looking on there, and be fastened at the bottom of the shaft, near to where it hitches on to the frame of the carriage. This will give play to the traces, and wholly relieve the thill-horse or horses from the undue prejudice to which they are exposed.

The principle here laid down is necessary, whatever other method may be had recourse to in removing the inconvenience.

**THILYPTERIS**, in Botany, a term used by Dickianus to express the common female fern or brakes.

**THIMA**, in Geography. See *TIMA*.

**THIMBLE**, a cover for the finger, made of brass, steel, or silver, and used by all people who few, as taylors, milliners, &c.

**THIMBLE**, in Sea Language, an iron ring with a groove round the outside, to receive the rope it is spliced into. Thimbles are spliced into the rigging and falls for blocks to be hooked to, or ropes to receive through where blocks would appear too heavy.

**THIMBLE ISLANDS**, in Geography, small islands near the coast of Connecticut. N. lat. 41° 9'. W. long. 71° 42'.

**THIMBRIC-KENY**, a village of Atian Turkey, in the province of Natolia, on the site of an ancient town called "Thymbra," built by Dardonus, king of Phrygia. Here are some considerable ruins, superseded of a temple of Apollo.

**THIMDA**, a town of Tunis; 8 miles S.W. of Bizerta.

**THIMIO**, in the *Materia Medica*, a name used by some authors for a peculiar fort of lignum aloes, which is blackish and very heavy, and extremely sweet.

**THIN**, a name given by the Arabian writers to earth of any kind.

Thus the bole armenic of Galen is called by Avicenna *thin Armeni*; and hence the word *muthin*, an adjective signifying earthy, or approaching to the nature of earth; a term applied to many medicines of this kind.

**THINA**, in Botany, a name by some authors have called the larix, or larch-tree.
THINGVALLA, a place of Iceland, about 26 miles distant from Reikjavik, and 24 miles from Skalholt; in which is a small, mean, and dirty church. The scenery about it is romantic; but the want of wood, and the effects of subterraneous heat, combine to give it a dreary appearance. The adjoining lake of the same name is a fine sheet of water, reckoned to be about ten miles long and from three to seven in breadth. In the lakes are two pretty large islands, called Svaradal and Nefty, composed entirely of volcanic matter. The depth of the lake is said to be very great; a line of rocks having been sunk without reaching the bottom. It receives the waters of the surrounding bogs, and near it is a place of springs, where the courts of justice were formerly held; but as Reikjavik is now the seat of government, the courts are held there. It does not appear why this place was originally selected for the seat of justice; but a town being once established, and trade carried on freely, and to a greater extent than in former times, ready recourse to the law became necessary. Although not more than fifteen years have elapsed (1817) since the judicial courts were transferred to Reikjavik, few remains are left to mark a spot so famous in the history of Iceland. The only building is a small wooden house, in which the consultations were held and sentence pronounced by the ridditman or governor. The magistrates and people assembled on the occasion lived in tents. The culprits who were condemned to die were beheaded on a small island in the lake Oxeran, which here flows into the lake. The females were drowned in a deep pool below the lake, a little farther up the valley. An ecclesiastical court used to be held at Thingvalla by the bishop of Skalholt, attended by the provosts and two ministers from each Syffel. It is suggested, that Thingvalla in Shetland, and Dingwall in Ross-shire, are evidently the same names as Thingvalla; and were probably, in ancient times, places where justice was administered. Towards the N. are several ranges of mountains, which, from the account received, and the appearances observed, are volcanic. Among these, the principal seems to be Skalbraided, a lofty Jokul, of which description of mountains others were seen at a distance. Although the preference of the superior court from Thingvalla to Reikjavik has, probably, been attended with advantage, the Icelanders, as a people, have some reasons for regarding this change with regret. The annual meeting at Thingvalla was not merely that of a tribunal of justice, but an assembly of the nation; and though the importance of this assembly was diminished, and its dignity degraded, by the subjection of the island to a foreign power, yet on the spot where the greatest among his ancestors often flew, the mind of the Icelanders and all ever have been awake to enthusiasm and patriotic pride. Heic fero, hic genus, hic majorum multa vestigia!"—Mackenzie's Iceland.

THINKING, cogitation, a general name for any act or operation of the mind.

Chauvin, with the Carthians, will have thinking to consist in a certain native, inherent motion or agitation of the human mind, of which itself is conceptions.—Native and inherent, since he conceives it no other than the very essence of the mind itself, or, at least, its principal and fundamental property: an agitation, since there is a new modification or change made in the mind, which we fearely know how to conceive without motion; add, that the origin and etymology of the word cogitation, according to Varro and Feildus, implies as much: cogito being used for cogitis.

When the mind turns its view inwards, upon itself, the first idea that offers, says Mr. Locke, is thinking; in which it observes a great variety of modifications, and of them from itself distinct ideas; thus the perception annexed to any impression on the body, made by an external object, is called sensation.

When an idea recurs without the presence of the object, it is called remembrance.

When brought after by the mind, and brought again into view, it is called recollection.

When held long under attentive consideration, it is called contemplation.

When ideas float in the mind without regard or reflection, it is called a reverie; when they are taken express notice of, and, as it were, registered in the memory, it is attention; and when the mind fixes its view on any one idea, and considers it on all sides, it is fully and attention.

These are the most obvious modes of thinking; but there are several others which we know of; and, doubtless, the mind is capable of infinite others, of which we have no notion at all.

The school-philosophers usually divide thinking, with regard to the object it is employed about, into understanding, intellectus; and willing, voluntas.

And hence, those are said to be the two powers or faculties of the human mind.

Intellectual thinking is further subdivided into divers kinds; the first, when the mind merely apprehends or takes notice of a thing, called perception; the second, when it affirms or denies a thing, called judgment; the third, when it gathers or infers a thing from others given, called reasoning; the fourth, when the mind disperses its own thoughts or ideas in order, called method.

Volitive thinking, or volition, admits of infinite different modifications, or new determinations.

Some authors extend the idea of thinking farther; and consider it in God, angels, brutes, &c. whence results a new division of thinking, into divine, angelical, human, and animal or sensitifive.

But the two first we know little or nothing of: the third is that of which we have already been treating. As to the last, viz. animal or sensitivfe thought, it is defined to be, an action of the soul attending to an external object, affected by means of the animal spirits duly agitated in the brain, to excite an idea.

The Cartesians maintain, that thinking is essential to the human soul; and, consequently, that there is no time when the soul does not think: but this doctrine has been very vigorously attacked by Mr. Locke; who labours to shew, that in sleep, without dreaming, there is an entire cesseation of the modes of thinking.

I think, cogito, according to Des Cartes, is the first, and most certain, of all truths; from which, alone, we draw this consequence, therefore I am, or exist, sum.—One might also say, cognosco, ergo Draus el. I think, therefore there is a God. —Logic is defined, the art of thinking methodically.

THINNING of Plantations and Woods, in Agriculture. The practice of thinning plantations of trees and woods, so as to let the plants of them have more room as they advance in growth, is mostly an operation of considerable importance; as upon it, perhaps, more than upon any other point of the after-management in such cafes, depends the nature, quantity,
ty, and modification of the timber which is raised and produced.

Woods of the natural kinds, the seeds of which are sown by birds or the winds on soils and surfaces of very different descriptions and forms, rise and spring up at different times, and of very different degrees of thickness, strength, and vigour in themselves and their different parts; consequently it is easy to suppose, that those which are placed in favourable situations and circumstances, will quickly overtop the others; and if they do not wholly destroy, will at least weaken them in such a way as not to be affected or inconvenienced by them, until the strongest trees ultimately find ample and sufficient room for their growth. In this way, although nature may be slow in her operations, she effects her purpose in a very complete manner. Besides these observances, Mr. Loudon has noticed that artificial thinning is only alluring nature; and that hence even leaving natural woods to be thinned by time, would not be economical.

It is suggested with regard to artificial plantations, that in these the soil is equally cultivated, and the plants are put into the ground much about the same size, and at the same time, and that hence they of course rush up together all nearly of the same height, producing neither ornament nor timber; and none being produced so strong as to take the lead and destroy the rest, they grow in this manner until they are so crowded as to exclude air and moisture. At which period, unless affluence has been previously given by thinning, the whole of the plantation dies together, and is destroyed.

Where thinning is necessary in old natural woods, or such as have been planted, it should constantly be performed by degrees in a regular manner, well considering the state, qualities, and habits of the trees, as well as the nature of the soil on which they grow, the situation and exposure in which they are placed, and other familiar matters. The outside of them should commonly be left thinner than the other parts, and the trees on the richer parts of the land be more thinned than those on the other descriptions of it. The thinning of the fide shoots and branches of the trees should likewise, in some measure, accompany the other thinnings, and be performed in a suitable manner to their natures, states, and purposes for which they are intended.

It is, however, wholly the custom to thin them out at about seven years from the time of planting them, or that of their first growing up, and to repeat it every seven years afterwards. When the planting has been performed in the proportion of from six to eight hundred trees to the acre, they may be made to stand, in the first thinning, at about one tree to each rod of ground, or nine trees to eight rods. But in the second thinning, a rather larger proportion of trees should be taken out, as rather more than one to each rod; and in the third thinning, the proportion may be made still in a larger ratio, so as to leave the trees about a rod square each. Much must, however, always depend upon the nature, situation, and circumstances of the particular plantations and woods.

In all these thinnings the worst trees should be removed, so as to leave the strongest and best plants to stand for timber or other purposes.

It is suggested, that as in most plantations the fir tribe of trees has been introduced either for the purpose of ornament or shelter; where thinning is practised, in such cafes, too large a proportion of these firs are molotly left. Hence, from their comparatively quick growth, it is concluded that such plantations have a disagreeable sameness through-
The town, they should always be thinned out to the distance of a foot and a half, two feet or more, as the soil may be of a light or more rich quality. And lettuces, when put in by trowel, should be thinned to the distance of from eight to twelve inches, according to the nature of the soil.

The thinning out of any other sorts of field-crops of these kinds must also be performed according to their natures and particular habits of growth.

Some of these sorts of crops are best thinned out in a gradual manner, as the turnip, carrot, beet, &c.; while in others it may be done all at once, as for the cabbage, and some other kinds.

There are several different methods practised in accomplishing this business, as by means of the hand simply, the use of the hand-hoe of different suitable sizes, according to the stature and circumstances of the crops, and lately in the raw kinds, by an implement invented for the purpose. This last is by much the cheapest and most expeditious manner of performing the work; if it should be found, on further trial, to be equally accurate and effectual in the execution of the business. This fort of tool or machinery was invented and constructed on the farm of Charles Gibbon, esq. at Quarner Park, near Lancaster, and a representation of it is given in the Corrected Agricultural Survey of that county, lately published. See Thinning and Hoeing Machine for Turnips, &c.

The other modes of effecting and completing this kind of work, are a great deal more troublesome, laborious, and expensive than the above, especially the first of them, as many hands and much time are required for doing it in the most proper and effectual manner by such means. Where the hand-hoe is employed, two or three different sized hoes are mostly made use of for the purpose in the different successive thinning hoeings, which, when in the hands of experienced workmen, do the business in a pretty quick, easy, and complete manner, as the supernumerary plants are struck and cut out with such exactness and regularity. It is consequently necessary in such cases to keep the hoes in a pretty sharp state, in order to perform the work well, and with neatness. The principal objections to doing this sort of labour by the hand, are its tediousness, and the treading which takes place during the operation.

Thinning out Plants, in Gardening, the pulling or drawing out such as are too close and thick in some crops of the general and other kinds, as well as in some other crops, so as that the remaining ones may stand at proper and suitable distances for producing the most favourable crops, plants, or other productions. This is mostly practised in the cases of the main crops of onions, carrots, parsnips, beets, spinach, and several other similar kinds, which are grown in the broad-cast manner; in different small feed crops, for raising plants to be afterwards set out, such, for instance, as the cauliflower, broccoli, cabbage, bokchoy, lettuce, endive, and many others; and in the producing and bringing forward young tree plants of mott forts in nursery grounds and other places.

Onion crops are, for the most part, thinned out at different times, as the demands of the markets, or in other ways may be, so as to leave the remaining plants at the distances of six or six inches or more from each other, according to their natures, kinds, and other circumstances; always, however, allowing sufficient room for their full and complete growths. Much advantage is often made in this way by the young onions which are thinned out, which would otherwise be lost and thrown away.

The carrot, parsnip, and beet crops are commonly thinned out at one or two thinnings, the standing plants being left at the distances of about six or eight inches apart, as the nature of the soil and crops may be. The young plants of the carrot kind, thus drawn, are in some cases bunched and made use of, especially when the crops are late in being thinned out, which should always be avoided as much as possible.

Lettuce and spinach crops may be thinned out at once to the distances of six, eight, or more inches between the plants, in the different kinds, as the nature of them may be, when put in upon the broad-cast plan. The thinnings are of little use or value, except for wattle purposes, such as being thrown to the hogs, &c. in these instances. Most other similar sorts of crops may be thinned out in the same manner.

The small feed crops of the different kinds should constantly be kept so thinned out as to prevent the plants of them from being drawn up in a weak manner, and unfit for being set out; as where the contrary is the case, there is always great wattle, and the plants seldom succeed so well. They should be gradually thinned out by planting, as well as in other ways.

Young tree plants, in mott crops, require frequently thinning out in their early growths, in order to raise and bring them forward in the best and most perfect manner. They should therefore, in general, be so kept thinned out as never to want sufficient room for rising in the manner which is the most natural and proper for them, and for preventing the injury they may suffer by standing too close in the rows or other ways.

Due, early, and proper thinning out of crops and plants, is of course a matter of considerable importance and utility in the garden culture of different sorts of vegetables, trees, and other productions of the same kinds.

Thinning and Hoeing Machine for Turnips, that sort of implement or machine which is contrived for the purpose of thinning or setting out this as well as other similar kinds of crops that stand in rows. It is made light, and constructed somewhat in the form of the plough, having a suitable apparatus attached to it behind as to be put in motion, and strike out the supernumerary plants as the horse proceeds regularly along the intervals of the ridges. The horse is driven by the person who holds and directs the tool while at work. It is capable of going over a very considerable space of ground in a short time, and if found, on the result of further trials, to perform the work with due accuracy and correctness, will be a very great acquisition to the drill turnip husbandry, and for different other purposes of the same nature.

THIONVILLE, in Geography, a town of France, and principal place of a district, in the department of the Moselle. The place contains 5014, and the canton 13,988 inhabitants, on a territory of 175 kilometres, in 27 communes; formerly belonging to the duchy of Luxembourg, and ceded to France by the treaty of the Pyrenees in 1659. N. lat. 49° 21'. E. long. 6° 15'.

THIORSAA, a large turbid river of Iceland, on the road from Skalholt to mount Helta, the course of which is nearly from N.E. to S.W. In its passage over rugged masses of lava rising abruptly from its bed, this river dalls among the rocks, and forms impetuous rapids and falls.

THIR, in Chronology, the name of the fifth month of the Ethiopians, which corresponds, according to Ludolf, to the month of January.

THIRD, TERTIUS. See Number and Numeration.

Third, in Music. The 3d is the most agreeable and necessary
necessary concord in counterpoint, throughout the whole system of practical harmony.

There are two kinds of thirds; the major or sharp 3d, which is four semitones or half notes above the base; and the minor or flat 3d, which is three.

Very agreeable music in two parts may be composed, and often is composed, of thirds only. The 3d is wanted with every other concord, and even discord, except the 4th, when it is used as such with the 2d instead of the 9th.

Dr. Pepusch, in his "Treatise on Harmony," has given curious and ample instructions for the use of thirds in composition.

It would be a curious inquiry, why a 3d was regarded by the ancients as a discord; and why it is called by the moderns an imperfection. We cannot afford space for long disquisitions on every subject of vain and frivolous curiosity, among which this would probably be numbered. But it seems as if the ancients estimated the perfection of consonances by the simplicity of ratios in the division of the monochord; regarding the octave as the most perfect concord next to the unison, as it was produced by a simple division of a string into halves, expressed by

\[ \frac{2}{2} \]

The next in perfection was the 5th, produced by a third part of a string.

After this, the 4th, which was reckoned by the ancients not only a concord, but a perfect concord, expressed by the ratio of

\[ \frac{3}{2} \]

A fourth part of a string gives the 15th, or double octave.

The fifth part of a string produces the major 3d to the 15th, which, though in the organ the flop called the tierce, it is a major 17th to the diapason; its ratio is expressed by

\[ \frac{5}{4} \]

The minor 3d is expressed by

\[ \frac{5}{3} \]

The major 6th, composed of four tones and a semitone major, as \( G \): its ratio is

\[ \frac{5}{2} \]

The minor 6th, composed of three tones and two major semitones, as \( C \): its ratio is

\[ \frac{5}{3} \]

The extreme sharp, or, as the French call it, the superficial 6th, composed of four tones, a semitone major, and a semitone minor, as \( G \# \): the ratio of this 6th is

\[ \frac{72}{2} \]

We believe that the triple progression of a series of perfect 5ths made the major 3ds so extremely harsh, that no natural good ear could admit them among the concords. And in the first attempts at counterpoint, it was a long time before a 3d was admitted in discant, in which diatessaronar and quintonar, or a diatonic series of 4ths and 5ths, now prohibited, was preferred to 3ds and 6ths in succession.

Third Borough, in our Ancient Law-Books, denotes a confable.

Third Earings, in Haddingly, the tilling or ploughing of the ground a third time.

Third Fiddle. See Estate, Commons, &c.

Third Night-and-hyd. By the laws of Edward the Confessor, a guest, who had lain three nights in an inn, was reputed a domestic, and his host was answerable for what offence he should commit.

For one night he was accounted uncouth; for two nights, guest; and the third, night-and-hyd, or hogen-hyde. "Prima nocte incognitus, secunda hostes, tertia domesticus centuror."

Third Order, a sort of religious order, that observes the

fame rule, and the fame manner of life, in proportion as some other two orders instituted before.

The third orders are not originally religious orders, but associations of secular, and even married persons, who conform, as far as their condition will allow them, to the design, intention, and rules of a religious order, which associates and directs them.

The Premonstrates, Carmelites, Augustinians, and Francisians, dispute among themselves the honour of having first introduced third orders; but the pretensions of the last appear to be the boldest.

The first contend, that the third order of Premonstrates began in the life-time of their founder St. Norbert, who died in 1134.

F. Diego de Coria Maldonado, a Spanish Carmelite, who has a particular treatise on the third order of Carmelites, derives them immediately, as well as the Carmelites themselves, from the prophet Elijah.

The third order of Augustinians, if we credit F. Bruno, was instituted by St. Augustin himself; but the arguments he produces are so frivolous, that F. Helyot observes, they are not worth refuting.

The third order of Francisians was instituted by St. Francis in 1221, in favour of people of both sexes; who being convened with the preaching of that saint, demanded of him an easy manner of living a Christian life; upon which he gave them a rule, the constitutions of which are not now extant, as written by himself, but only as reduced and confirmed by pope Nicholas IV. sixty-eight years afterwards.

The first order of this faint are the monks called Minor Friars, comprehending the Cordeliers, Capuchins, and Recollets; the second comprehends the nuns of St. Clare; and the third, several orders of both sexes, who live at liberty: and these are what we call the third order. See Francisians, &c.

Of this order, which was only established for secular persons, several of both sexes, to attain the greater perfection, have afterwards commenced religious, and formed various congregations, under various names; as Religious Penitents of the Third Order, &c.

Third Point, or Tierce-point, in Architecture, the point of section in the vertex of an equilateral triangle.

Arches or vaults of the third point, called by the Italians tierzo acuto, are those confiting of two arcs of a circle meeting in an angle at top. See Arch.

Third Point, in Perspective. See Point.

Third Rate. See Rate.

Third Subsidy Duty. See Duty.


Third Year, Tithe of the. See Tithe.

THIRDENDALE, a liquid measure used at Salisbury, containing three pints.

THIRDINGS, the third year of the corn or grain growing on the ground at the tenant's death, due to the lord for an heriot, within the manor of Turfat, in Herefordshire.

THIRLAGE, or Thirlage to Mills, in Rural Economy, a contract or power authorized by law, to prevent the tenants of certain districts from carrying their corn to be ground any where else than at a particular mill. It was a practice which formerly prevailed much; and it was too often used as an engine of oppression, that proved extremely galling to those who were obliged to submit to it, but which at present is nearly, if not wholly done away, except in certain places.

The account of the origin and nature of this oppressive practice,
THIRLAGE.

It is stated that this species of thirlage existed in most of the boroughs of the above country; and that the mill generally belongs to the incorporation, where the borough holds directly of the crown, or what are called royal boroughs. But where a borough holds of a subject superior (the lord of the manor), the mill generally belongs to the superior, and the accustomed duties are paid to him, or to his tenant in the mill.

It is to be observed, the writer says, that in all these thirlages, it was the land of the fervient tenement that was bound; and that although it should pass by purchase through twenty different hands, every purchaser, and all his people upon these lands, were equally bound to frequent the dominant mill.

It is further noticed, that there were also three different species of duties paid at the dominant mill; as, first, the muture (mutura, grinding); secondly, the bannock (loaf); and, thirdly, the knaveship.

It is remarked, that the first of these duties belonged to the heritor and proprietor of the mill; and seems evidently to have been the fine or prenium, originally settled, as the inducement for his being at the expense of erecting the mill, and for supporting the machinery of it in future. The bannock was the duty paid to the miller; and the knaveship the duty paid to the under servants in the mill.

It is stated, that the quantity of meal paid under the name of muture, varied considerably in different counties, and even at different mills. It has been known as high as the eleventh boll, and sometimes as low as the twenty-second boll; and in one particular instance so small as the thirty-second: but it may be taken, on the average, at nearly the seventeenth boll.

The other duties were also various; but they may, it is supposed, be taken jointly as equal to the half, or from that to three-fourths of the muture.

But wholly independent of these several duties, the poffessors of the fervient tenement were, it is said, bound to perform certain personal services to the mill and its appendages: for instance, when the dam-dyke, or the rampart that directs the stream of water from the river to the mill wanted repair, or when the aqueducts to and from the mill required to be secured, the people of the servient tenement must turn out and perform these works. When the roof of the house in which the mill flood decayed, they must find thatch for making that repair, and they must put it on.

When grind-flones were wanted, or an axle, or any other part of the machinery that required a heavy carriage, they must go with their horses and carriage to the nearest place (whatever might be the distance) to bring these articles to the mill.

But this species of thirlage, it is believed, never was known in the above county; or that at least, if it was, it has long since been forgot. Besides, it is noticed, that there was another circumstance peculiarly fortunate, which put it in the power of most of the landed proprietors of that county, without difficulty, to emancipate their tenants from the thirlage even of grindable grain, namely, that the landlord almost universally was proprietor both of the dominant and servient tenement; and that as he afflicted his tenants to his own mill by a covenant in the lease, progressively as the leases of the mills expired, the landlords in general emancipated their tenants from every species of thirlage, at a conversion of twenty shillings per plough, which was paid by the tenant; and he and his servants were left at perfect freedom to retort to any mill, where they could get their work best done, and at the lowest rate.

The cafe, however, it is remarked, was widely different in practice, which has been given by the author of the original Agricultural Survey of East Lothian, in the latter district of country, may not be uninteresting to the curious inquirer. It is remarked, that in former times, corn was reduced into meal, at ancient Rome, by a hand mill, which was called a quern; and which was used in the more remote parts of the Highlands of Scotland long after the year 1445.

It is certain, however, that the water machine called the mill, for the grinding of corn into meal, is of high antiquity in the same country; and as it was introduced before the period of record, it may be fairly said "caput inter nubila condit." But from the ancient name of one of the duties, knaveship, which will be afterwards explained, the mill would seem to be of Saxon origin.

It seems also natural, that a person who pollished a stream of water upon his estate, should be invited by his neighbours to be at the expense of erecting a mill upon this stream; and that they, on the other hand, should thirds, that is, affrict and bind their lands, in all time coming, to use and frequent this mill with their corn, and to pay a certain proportion of the meal according to the universal mode then practiced of paying in kind for the grinding of it.

Anciently, it is contended, there is reason to believe, the mills were at first erected upon ecclesiastical lands, and belonged to the clergy.

It is stated, that there are three different species of this sort of servitude known and acknowledged in the law of the above country; but of these, two only belong properly to rural economy; however, in order more thoroughly to understand the subject, the whole may be shortly explained.

It is noticed, that the first and the lightest species of thirlage, is called the thirlage of grindable corn. By this covenant of thirlage, it is stated, that every ounce of corn produced upon the servient lands, let the quantity be ever so great, must be brought to the dominant mill, and there manufactured into meal, and the covenantor or accustomed duties paid.

It is suggested, that the only limitation that this severe thirlage admitted of, was in favour of feed and of horse corn.

Sometimes a special covenant was made, by which the poffessors of the servient lands paid what was called dry muture; that is, they paid a quantity of corn to purchase the freedom of going to market with the remainder in the future state; and where confluent immemorial use has functioned, this custom, the courts of law generally, it is said, have for a long time mitigated the severity of this species of thirlage, as to find, that the proprietor of the dominant mill can demand no more than that quantity of dry muture, which the immemorial use has established. Such decisions are affected to be grounded upon the principle of a preformed contract, of which the record or memory has been lost betwixt these parties, whereby the one was bound to pay, and the other to receive, the commutation fixed by the usage.

The third and last species of thirlage's, it is observed, called the thirlage of in erva et ilato, and belongs properly to urban tenements; the meaning of it is, that corn, whenever produced, if brought for consumption within the boundaries of the dominant mill, must be carried to the mill and manufactured there, and pay the accustomed duties.
THI

in many parts of the north of the above country: and it is known, from what has already been mentioned, that there were many estates, or servient tenements, belonging to one proprietor, which were affixed to mills, or the dominant tenements, belonging to another proprietor, and that not a few of these thirlages were the severe one of growing corns.

The writer does not think it here necessary to inquire whether these mills were originally erected by the clergy, and since the reformation in religion, have passed into the hands of laymen; or whether, perhaps, if mills are truly of Saxon origin, they were generally, and at once introduced into the above country, when under the Saxons, who certainly were, it is thought, a more enlightened people than the Scottish and Pictish inhabitants of the North, whole ignorance, of course, may have led them more generally to subject themselves in the servitude of thirlage, to invite their clergy, or a few of the more wealthy among them, to undertake the arduous task of erecting mills.

From the near analogy betwixt tithes and thirlage, it has appeared to the writer a matter of just suprize, that the parliament of the above country, which, in the course of a preceding century, first authorized the valuing of tithes for the purpose of fixing a modulus of payment, and afterwards compelled the lay titulaires (proprietors) to sell their tithes at nine, and in some cases at six years' purchase, to the proprietors of the lands, did not introduce a fixed modulus for thirlage, which certainly operated like tithes, as a tax upon industry, to bar, or at least to retard agricultural improvement in its progress. See Tithes.

THIRLBY, SYAN, LL.D. in Biography, a learned critic, was born about the year 1692 at Leicetser, and finished his education at Jesus college, Cambridge, blending promising talents with self-conceit, litigiousness of temper, and a habit of intemperance. He appeared at an early age as a writer of controversial pamphlets, and thus acquiring some degree of reputation, obtained the fellowship of his college at the age of about 21 years. In mature life he probably applied to study with greater diligence, for his edition of Justin Martyr, to which he was indebted for literary reputation, was published in 1722. Verstife in his disposition, he diverted his attention at this time from divinity to physic, and accepted the post of librarian to the duke of Chandos. In this station he continued for a short time, and being under a necessity of quitting it, he became a subscriber in civil law, and afterwards in common law. Weary of these pursuits, he resided in the house of his former pupil, Sir Edward Walpole, by whose interest he obtained a free place in the port of London, of the value of about 100l. a-year. Upon leaving this asylum, he took private lodgings; but continued to indulge his habit of gaming and intoxication. He is said to have contributed some notes to Theobald's edition of Shakspeare; but his self-indulgence and indolence rendered him unfit for mental exertion, and he closed his career in December 1753. His edition of Justin Martyr, cenured by some, but regarded upon the whole as a valuable performance, contains Justin's two apologies, and his dialogue with Tryphon the Jew, Greek and Latin, with notes and emendations by the editor, and select notes by former editors. Nichols's Lit. Ancrd. Gen. Biog.

THIRLWAL CASTLE, in Geography, a boundary fortress between England and Scotland, on the Piets' Wall; 3 miles N.W. of Haltmefel.

THIRONE de Gardais, a town of France, in the department of the Eure and Loire, 21 miles S.W. of Chartres.

Vol. XXXV.

THIRSK, or Thrusk, a borough and market-town in the wapentake of Bridorth, North Riding of the county of York, England; is 23 miles N.W. by N. from the city of York, and 223 miles N.N.W. from London. It is situated in a plain, nearly surrounded by hills, on the banks of a rivulet called Cod-heck, which divides the town into two parts, respectively named the Old Town and the New, which are connected by two small stone bridges. The two towns are distinct, as far as relates to the election of members; but in all other respects are considered as one. The civil government is vested in a bailiff, annually chosen by the burgage holders. The New Town stands within the precincts of the ancient castle of the Mowbrays. In the centre of the town is the market-place; which would be one of the finest in the county, were it not for the tolbooth and shambles, now in a ruinous condition. The market is held on Mondays, and is well supplied with all kinds of provisions. Five fairs are held annually for horned cattle, sheep, leather, and woollen cloth. These fairs attract a considerable number of dealers, and, with the advantage of the great North road from York, are very beneficial to the town, and in some degree supply the want of manufactures, of which there are only a small quantity of coarse linens and facking, and a few bridles and saddles. The population, as returned to parliament in the year 1811, consisted of 2155 persons, occupying 549 houses. The parish church stands on a rising ground at the northern extremity of the town. The roof, which is elliptical, and of oak, ornamented with carving, is supported by a double row of pillars and pointed arches. In the south wall of the chancel, near the altar, are three ornamented stone seats. The church is generally supposed to have been built out of the ruins of the ancient castle, which was demolished in the reign of Henry II. A moat and rampart are still to be seen, but no vestige of the building remains; and in Camden's time, it was nearly in the same state. It had once, however, been a place of great strength, when held by the potent Mowbray family. It was here that Roger de Mowbray began his rebellion against Henry II. and joined the king of Scotland against his own sovereign. The revolt was suppressed, and the castle of Thirsk, as well as several others belonging to the rebellious lords, were by the king's order destroyed. Besides the parish church, the Calvinists, the Quakers, and the Methodists, have their respective meeting-houses. Here is also a School of Industry for poor girls, who are clothed and taught reading, writing, and arithmetic, plain work, knitting, &c.

That division of the town called Old Thirsk, is a borough by prescription, and returns two members to parliament. The right of election is in the occupiers of burgage tenements, now only fifty in number, of which forty-nine are the property of Sir Thomas Frankland, bart. Old Thirsk consists of a range of cottages on each side of the turnpike road leading from York to Stockton, and of two squares surrounded by the same kind of buildings. In one of these squares, called St. James's Green, the cattle fairs are held; the other is the steeple of an ancient church, of which, time has long since swept away every vestige. In the latter of these squares is an elm-tree of venerable antiquity, from which the place takes its name, Hawm (that is Elm) Green; and under the shade of whose branches the members of parliament are elected. One of the chief inconveniences of Thirsk and the adjacent country, is the scarcity and high price of coal, which is brought from the county of Durham in small carts, containing from eighteen to twenty-two bushels, varying in price according to the season.

In the vicinity of the town is Byland abbey, which was founded
banded in the year 1177, by Roger de Mowbray, when a
stately monastery and church were erected, and dedicated
to the Virgin Mary. This abbey continued to flourish till
the general dissolution in 1540, when the site and most of
the demesnes were granted to Sir William Pickering. At
present, the ruins and feite belong to the honourable family
of Stapylton.

Near the base of the Hambleton hills, within four
miles of Thirsk, is Thirskly-Hall, the seat of Sir Thomas
Frankland, Bart. The walks and pleasure-grounds are ex-
tensive and well laid out; and the house is an elegant mo-
dern structure.— Beauties of England and Wales, vol. xvi.
Yorkshire; by J. Bigland.

THIRST, a painful sensation, occasioned by a vellic-
tion of the nerves of the throat or fauces, and producing a
desire of drinking. See Digestion.

Thirst may be sometimes elicited by rolling a clean bullet
or a pebble in the mouth, which occasions an extraordinary
issue of saliva to moisten the throat, &c.

Mr. Boyle mentions a man who could easily abstain from
drinking for nine days, and yet have his diet nothing more
liquid than usual; the secretions of urine, sweat, &c., being
performed all the while regularly, and in the same quantity
as usual.

In tropical cafes, where there is not a right secretion of
the urine by the renal glands, and the vessels and parts of
the body are loaded with too great a quantity of serous
humours, a great moderation in drink might be attended
with good success, provided some liqueur could be found
out to allay that uneasy sensuation. Probably this would be
best performed by mucilages acidulated with spirit of vitriol
or sulphur, or jellies with juice of lemon, &c. and that a
small quantity of such a composition, now and then used,
might be of as much real service, in quenching thirst, as
draughts of liquors, which increase the symptoms.

In feverish disorders, the patient is frequently tormentcd
with a violent thirst, which is moderated by acidulating the
barley-water, or sage-tea, with spirit of vitriol, or with lemon-juice; but by nothing so much, as allowing the
patient some slices of an orange. Pringle, Observ. on Dif-
calcs of the Army, p. 135.

THIRSTY Sound, in Geography, an inlet or bay on the
N.E. coast of New Holland, so called by Cook in 1770,
because it afforded no fresh water. It lies in S. lat. 23° 10',
and W. long. 21° 18'; and may be known by a group of
small islands lying under the shore, from two to five
leagues distant, in the direction of N.W., and by another
group of islands that lie right before it, between three and
four leagues out at sea. In this inlet is good anchorage in
6, 8, and 4 fathom; and here are places very convenient
for laying a ship down, where, at spring-tides, the water
does not rise less than 16 or 18 feet. The N.W. point of
Thirskly Sound was called "Pier-Head."

THIRTEEN ISLANDS, a cluster of islands in the
Pacific ocean, among the New Carolinas, so named by
Capt. Wilson. Lat. of the most southerly 7° 10'.
L. long. 14° 30'.

THISATON, a river of Canada, which runs into lake
Huron, N. lat. 46°. W. long. 84°.

THISMA, a name used by some for any subterranean
wine, or bed of a mineral.

THISTLE, in Agriculture, a well-known prickly trou-
ble-some weed, common in corn and other fields. It has
been observed, that wherever thistles grow naturally, it is a
fire fly that the land is strong, and of a tolerable good
quality; but that they are at the same time a great annoy-
ance to every plant intended to be cultivated. And it has
also been well remarked, that there are no weed-plants over
which the economical farmer ought to keep a more watchful
eye than the thistle tribe, as they are not only wholly use-
less, but occupy much ground, and being furnished with
downy feets, are capable of being multiplied and car-
ried almost to any distance. Besides, they do much mis-
cchief by impeding the work both in handling hay and corn
crops. It is of course a matter of much consequence to be
well acquainted with the qualities of each kind, in order
to enable the farmer to judge with certainty how far and by
what means their destruction may be effected in the most
certain and ready manner.

There are a great many sorts of thistles; and those which
chiefly deserve the attention of the farmer, are the annual,
biennials, and perennial kinds.

There are four of these plants belonging to the first divi-
sion or fort, namely, the milk-thistle, which grows to the
height of two or three feet; the heads hang down, and the
flowers smell somewhat like milk. It is frequently found
occupying whole fields, particularly where the lands are of
a chalky or barren quality; and sending forth flowers in
July and the following month in great abundance. The
milk-thistle, which is found plentiful in most waste places,
and upon old banks, being well known by its beautiful
large leaves, which are variegated with white spots and
veins, as if they had been sprinkled with milk. The flow-
ering season of this plant is in August, or thereabouts.
The 

...
the corn saw-thistle, which is a very troublesome weed in arable land, flowering in July and the succeeding month. See Sonchus.

And the common or field-thistle, which has many provincial names in different places, as the horse-thistle, the cursed thistle, &c. This is a thistle which is more general in its growth than any of the others, being found not only by the sides of roads, but also in arable and pasture lands, and it is remarkably prickly, growing from two to three feet in height, but the heads of the flowers are small, and of a purplish colour, though sometimes white; it flowers in July, or about that period. See Carduus and Serratula.

It is obvious, from what has been said, that the annual and biennial sorts of thistles may be readily removed, by preventing their running to seed and disintegrating themselves over the land; which is best effected probably by carefully eradicating them, or frequently moving them over closely by the surface, and rolling. But in the perennial sorts, from their roots continuing in the earth, increas- ing and throwing out new shoots or items every year, there is much more difficulty in extirpating them, and they, perhaps, can be no other way completely destroyed than by rooting them out on arable land by trench or deep ploughing and frequent harrowing, or by fallowing or laying the land down to pasture; for the first of these sorts seldom appears in pasture lands. But for destroying the common thistles, the best method is perhaps by cutting them over in the bleeding season frequently by proper implements. The writer of the Berkshire Agricultural Report, who thinks them particularly noxious, troublesome, and inconvenient among the corn and grass crops, proposes drawing them up by an implement of the forceps kind, somewhat similar to that described under the head noticed below, especially the for the which is termed Ferrariata aevus; or if they be cut over about an inch above the surface of the ground, it is believed they will be liable to rot, on account of the item being filled with water. They also frequently bleed to death when cut over in this way about the month of Au-
gust, as hinted at above. See Thistle-Drawer.

Others suggest that thistles might probably be destroyed in arable land by continued fallowing for one or two summers; with such repeated ploughing and hoeing as wholly to prevent their vegetating; but as such a progress would be tedious and expensive, an easy, expeditious, and effectual mode of eradicating them in this cafe, seems equally want- ing and desirable, as in that of grass lands. Thistles are likewise very troublesome in hedges, especially those of the forow and the large rough kinds, and should constantly be rooted out and removed as soon as possible, as no hedge can go on well that is much infested with them. See Thistle-Cutter, Weed, and Weeding.

It may be noticed, that by an excellent regulation in France, a farmer may use his neighbour who neglects to thistle his land at the proper saisons, or may employ people to do it at the other's expense. And it were to be wished that a similar law was enacted here, to prevent the wide-spreading mischief occasioned by the seeding of this pernic- ious weed; among which may be reckoned, besides its choking the young corn, that if wheat in particular be not well thilled, the reapers take up the griss fo tenderly, left they should prick themselves, that by their loose handling of them, they sometimes leave upon the ground corn enough to sowe the whole field. There is much in- convenience often experienced too in working hay from them.

Something in the same way as above has also lately been done here, especially in regard to the removal of them from the sides of highways and roads.

Though the sow-thistle has commonly been considered as a troublesome and injurious weed in tillage lands, it has lately been conceived by some to possess no small degree of nutrient power; and on this ground it has been suggested by the writer of the "Experienced Farmer," that it may be a plant of considerable fattening properties when properly raised and cultivated. When taken young, and cut or broken, it produces something, it is said, like cream; and he has noticed that many animals eat it in preference to every other plant now in vogue. Sheep, when in clover, &c. will feed upon it so greedily as to eat the very roots. Pigs likewise prefer it to almost any other green food. Rabbits will breed more speedily when fed with saw-thistles, than with any other food he knows of, except dandelion; which is of the same nature: and is now sold in Covent Garden market to the breeders of tame rabbits, to make the does take buck more readily. A man of his acquaintance, who was allowed better skill with stallions than the generality of people, used to search for saw-thistles, and give them to his horses to make them serve mares more readily and effectually. When he could not get saw-thistles, he fed them, it is said, with new laid eggs and milk, or cream, if he could get it; but he preferred saw-thistles or dandel- ion to any thing.

And there is, he contends, a well-known and remarkable proof of the nourishing and feeding quality of the saw-thistle, in the fat weather sheep fed to such an amazing size by Mr. Trimnell, of Bicker-fen, near Boflon, upon fen-land. This sheep, it is said, was bred by Mr. Hutchinson, in Hail- fen, from a ram bred by Mr. Robinson of Kirby, near Sleaford. He never ate any corn, oil-cake, or other similar dry food, but fed wholly on grass and herbage. Being turned with many other sheep into a field of clover, he was observed first to search for the saw-thistles, and would eat no other food while any of these could be found in the parts of the field that were hurdles off successively, a little at a time. None of the other sheep that fed with him, how- ever, thowed any extraordinary liking for the saw-thistle. A small hut was built for him in the field to repose under in hot weather: and when the part that was hurdles off became bare of food, his attendants, on account of his liking for saw-thistles, gathered a quantity of them for him, which they gave him at particular hours, three times a day, from two to five pounds at a meal.

It is added, that when standing on his feet, he measured only two feet six inches high: he was weighed once a month, and weighed alive twenty-six stones, at fourteen pounds to the stone. He gained only one pound the last month; and as it was judged, therefore, that he was quite ripe, and would not increase any more, but might possibly lose weight the next month, he was killed on the 15th of October 1791, by Mr. Isaac Lumby, of Bicker, being then a four-year-old, or four-year-old sheep.

The writer further states, that the skin, hung up by the nape part, measured ten feet two inches from the point of the nape to the tip of the tail; and was fold for 7s. 6d. in the common course of butchery. And that the carcass measured five feet from the nape to the tail; the rump or cufion eight inches and a half in depth; plate or fore-flank the same thicknees; breast and seven inches; and was one yard five inches and a half round the collar. That the legs were reckoned at 40lbs. each; but if cut haunch of venison fashion, they would, it is said, have weighed 60lbs. each. Mr. Lumby was offered 2s. a pound for them; so that he could have sold the two legs along for 10d. when fo cut.

3 Z 2 This
This is certainly a remarkable instance of fatness, but it
might probably depend more on the disposition of the
animal to take on fat, than on the fattening quality of the thistle
or food on which the sheep was fed. Many further trials
are necessary to fully ascertain the point.

Thistle, Biseled, Carduus benedictus, vul. enicus. See Centaurea.

As an article of the Materia Medica, the biseled thistle,
which is the hairy wild enicus of Miller, and the centaurea
benedicta of Linnaeus, was formerly much used in infusion,
as a gentle emetic, in fevers and certain mists.

Dr. Lewis has often observed excellent effects from a
light infusion of carduus, in weaknesses of appetite and in-
digestion, where the stomach was injured by irregularities,
or opprised by viscid phlegm; nor has he found any one
medicine of the bitter kind to fit so easily on weak stomachs,
or to heat so little. These infusions, taken freely, promote
the natural secretions. Drink warm in bed, they com-
monly increase perpiration or excite sweat; and as they
act with great mildness, not heating or irritating consider-
ably, they have been used, in this intention, in acute as well
as chronic cases. The seeds, which, as well as the leaves,
have a considerably bitter taste, have sometimes been used
as sudorifics or diaphoretics, in the form of an emulsion.
Cold water poured on the leaves, extracts, in an hour or
two, a light grateful bitterness; by standing long upon the
plant, the liquor becomes disagreeable; a strong decoction
is very nauseous and offensive to the stomach. The ex-
tracts, obtained by infusing both the cold infusion and decoction,
have the same differences as the liquors them-
selves. Rectified spirit extracts, in a short time, the light
bitter part of this plant, but does not take up the nauseous
near so easily as water. On keeping the watery extracts
for some months, a considerable quantity of salinic matter
was formed on the surface, in small crystals, resembling
in shape those of nitre, in the taste bitterish, with an impression
of coolness. Lewis's Med. See Centaurea Bene-
dicta.

Some diil a water from it, which they use in cordial and
sudorific potions.

Thistle, Cardine. See Carline.
The root of the cardina acutus of Linnaeus, is suppos-
ed to be diaphoretic, antityphic, and antemtic. It has
been greatly esteemed by some foreign physicians, in acute
malignant as well as in chronic diseases, and given in sub-
stance from a scruple to a drachm, and in infusion from one
to two drachms and more. It is rarely to be met with in our
shops. See Carline Gipsfeens.

Thistle, Dijaff. See Atractylis.
The roots of the atractyla gymmifera of Linnaeus, or pine-
thistle, which is a native of Italy and the island of Candy,
yield, if wounded when fresh, a viscid milky juice, which
concretes into tenacious mlasses, at first whitish and refhbling
wax, but when much handled growing black; supposied to
be the ivion, and acanthina majufhe of the ancients. The
juice is said to have been formerly chewed for the fame pur-
pofes as maltich, and the root itself of the fame virtue with
that of the carline thistle. Lewle.

Thistle, Fife, a species of Carduus; which fee.
Thistle, Fuller's. See Dipsacus and Teasel.
Thistle, Gentle, a species of Carduus; which fee.
Thistle, Globe. See Echinops.
Thistle, Golden. See Scobilus.
Thistle, Hedge-bog, a species of Cactus; which fee.
Thistle, Ladies, or Milk, a species of Carduus; which fee.
Thistle, Melon. See Cactus.

Thistle, Saw. See Sonchus.
Thistle, Downy Saw. See Andryala.
Thistle, Star. See Centaurea.
Thistle, Torch. See Cactus.
Thistle, Woolly. See Onopordum.

Thistle-Cutter, in Agriculture, a tool of the sward-
dressing kind, for cutting up thistles and other coarse weeds
and plants.

An effective implement of this fort has lately been in-
vented, delineated, and described by Mr. Amos, in his work
on "Agriculture and Planting."

The plan of the whole machine, when complete, is that of
a fort of square, in which the leading share is made of caft-
steel, in the form of an isosceles triangle, whose equal sides
are fourteen inches long, and its base twelve inches, being
about one-eighth of an inch thick in the middle, tapering
to a very fine edge on the outside. There are four pieces
of ash-wood, three inches square, and two feet four inches
long, to which the fetyhes are fixed, and which are called the
fetyhe-handles. There are also four fetyhes, three feet long
from point to point, four inches broad at the widest part,
made of caft-steel, and which, the inventor fays, are manu-
factured by Meffrs. Hunt and Company, at their caft-steel
manufactory, Brades, Birmingham. There are likewise four
other pieces of ash-wood, three inches square and two feet
five inches long, for throwing the two hindmost fetyhes to
their proper distance, and which are braced two and two
gether by four bars, which are one by two inches square,
and eighteen inches and one-fourth long. And there is a
main piece of ash-wood, three by four inches square, and
five and a half feet long, to which all the other pieces are
fixed by hooks, and eye-bolts, by means of which the fetyhe-
handles act as it were upon hinges, and the fetyhes are
thereby made to form the fame parallel line with the surface
of the land, whether it be concave, convex, or level. For
this purpofe, it is fuppofed that it might be useful to make
a joint in the middle of this piece, where the land is uneven.
And in the fore part of this piece a fawgate is to be made,
three-fourths of an inch from the under fide, at the hind
part of the share, and one inch from the under fide at the
front of the wood, which gives an elevation to the point of
the share, to receive the share where it is fixed.

There are four iron braces, one of the ends of which are
fixed in the fetyhe-handles, and the other ends to the under
fides of the fetyhes by a fcrew. There is a flape, to which
the chain and fwinging-tree is fixed, and by which the ma-
chine is drawn. There are two mortifc-holes on the fides,
which receive the tenons of two upright fids, to which
pullies are fixed for lifting the fetyhes off the ground, where
there is any thing to obftruct them or retard their progres.
Each of these fids is one and a half by four inches square,
and three feet long. Two small pullies are fixed on each
side of these upright fids. Through the pullies of the
foremost fid, a small rope fasses (one end of which is fixed
to the outside of the iron braces), and likewise through
the pullies of the hindmofl fid, and then the two ropes
unite at about two or three feet behind the whole machine;
and through the pullies of the hindmofl fid pass two other
small ropes (one end of each being fixed to the outside
of the hindmofl iron braces), and then the four ropes unite to-
gether, where the manager holds them as a coachman does
the reins of four horses. By means of these ropes the
fetyhes may be lifted to any degree of elevation, by which
contrivance any unevenness of the ground, or other obftruc-
tions on its surface, such as ftones, roots, ant-hills, &c. &c.
may be easily avoided and paffed by.

The fwinging-tree is thirty-three inches long, and the
chain
chain which looks into the flap for drawing the machine by, is thirty inches long.

The whole of the scythes, when properly fixed, projects beyond the wood, and cut the thistles three-quarters of an inch above the surface of the ground. In cafes where the scythes want sharpening, it is observed that they may be fixed perpendicularly up, or taken off entirely; and that, at the same time, the horses should be unearthened and taken away.

In using the machine, it is advised by the ingenious inventor, that as soon as the thistles are in full flower it should be set to work, the length way of the ridges; and that if the scythes are kept very sharp, it will make excellent work. And when the thistles have been cut, they should lie a day or two, it is said, to perish by the loss of their sap-juice: the ground must then be cleared, and the close or field rolled, the cross ways of the ridges, with a very heavy roller, which so crushes the hollow rumps, and renders them so porous to water, that their roots soon rot and are destroyed. But to expedite the operation of the implement, and the destruction of the weeds and plants, the land should be cleaned of all kinds of rubbish, the latter end of March or beginning of April, being dressed with the sward-dresser, and then rolled the cross ways of the land, or ridges, with a weighty roller, as just mentioned. See Sward-Dresser.

Thistle-Drawer, an useful implement of the forceps kind, which is extremely beneficial in drawing up the common field-thistle and some other strong sorts of weeds. It may be constructed either of wood or iron, in the latter case having sockets for receiving wooden handles. When made of wood, it should be of the hard and lefs brittle kind, as good tough ash. It is usually formed from two to three feet in length, having six notches or blunt teeth cut in each blade, at the bottom part, where it bites or seizes the plants, and each arm well fitted to the other, turning upon a strong pivot or pin. In its operation the thistle is seized close to the ground and firmly held, so as to be drawn out with considerable length of root. It has been long in use in the northern parts of Lancashire; and is said to be lately introduced from Wilts into the county of Gloucestershire, in the agriculture report of that district. It is an useful and effective tool for the above purpose, and only calls about two shillings when made of wood, and three or four when of iron. It has long been known in the first of the above counties by the provincial name of Gripe.

Thistle-Fly, in Natural History, a small fly produced from a fly-worm hatching in the protuberances of the carduus hemorrhoeadalis. In the protuberances of this thistle, while they are closed in all parts, the worm of this fly, from whose injuring it, at the time of depositing the eggs from which it was hatched, the protuberances arose, undergoes its last transformation. It here makes of its own skin a shell in form of an egg, within which it puts on the nymph plate. When this nymph becomes a living fly, the least part of its difficulty is the finding its way out of this shell; it has a stronger prision than that, and before it can obtain its liberty, must force its way through the much more closely compacted fibres of the protuberance of the vegetable. It has, however, no other means of doing this difficult work, but that of infesting its head, and throwing out the bladder or muzzle with which all these creatures are provided in this flate. See Thistle-Galls.

This is a difficult operation, and many of the creatures perish in the attempt; but what much forwards the success of it, in many cases is, that the flake of the thistle often becomes naturally half rotten before the time of the fly’s egres. Reaumur, Hist. Inf. vol. iv. p. 338.

Thistle-Galls, a name given by the more accurate authors to the protuberances on the flake of a species of thistle, called by authors cardus hemorrhoeadalis, from those tubercles, which are supposed to resemble those of the hamorrhoidal veins in persons subject to the pikes. These have been supposed a natural production of the plant; but they are far otherwise. The whole history of them is, that a certain species of fly always deposits its eggs on the flakes; and the young ones, when hatched, gnaw their way into the substance of the flakes, and the copious derivation of the juice, occasioned by their sucking, produces the tubercles which are found on it.

These tubercles are of a roundish or oblong figure, and are of various sizes, from that of a pea to the biggest of a nutmeg; they are much harder than the rest of the flake, approaching to a woody structure; when cut open, they are found to contain several oblong and narrow cells; there have no communication with one another, and are each inhabited by a small white worm, which has two hooks at the head; with these it breaks the fibres of the plant, in order to get at its juices. When it has arrived at the time of its change into the nymph flate, it ceases to eat, and drawing up its body much shorter than usual, its skin hardens, and forms a shell, under which it changes into a very beautiful two-winged fly; the wings are whitish and transparent in the middle; and at the edges surrounded with black in the form of a chain of figures like the letter Z; the body and breathing of this fly are of a beautiful black, with some flight variations of yellow, with which the shoulders are streaked; the anterior part of the head is white, and its back-part edged with a yellow down; the antennae are reddish, and the legs are partly black, and partly of a fine clear brown.

In observing the changes of the worms of these galls, there are often observed some which go through them in a different manner from the rest, and finally produce a very different species of fly. These are the progeny of the eggs of some other species of fly, whose worm being carnivorous, is lodged by the art of its parent, while it is yet in the egg flate, in the substance of this gall, there to prey upon the defenceless inhabitants.

There are many species of galls the inhabitants of which are exposed to enemies. In those it is common to find the proper inhabitant and the devourer in the same cell; the one feeding on the juices of the plant, the other on its juices; but this is not the case here, these worms immediately destroying the proper inhabitants, and being found always alone in their cells. Reaumur, Hist. Inf. vol. vi. p. 221.

Thistle, Order of. See Andrew.

Thistle, our Lady of the, was also a military order, instituted in 1370, by Louis II, duke of Bourbon. It consisted of twenty-six knights, of which that prince and his successors were the kings. Their badge was a sky-blue girdle; and, on solemn occasions, a mantle of the same colour, with a gold collar, interwoven with flower-de-luce; among which was the word of service, hope, in capitals.

Thistle-Take, a custom in the hundred of Holton, in the county of Chester, whereby, if in driving heales over the common, the driver permits them to graze, or take but a thistle, he shall pay a halfpenny a beaft to the lord of the fide.

At Fiskerton, in Nottinghamshire, by ancient custom, if a native, or cottager, killed a swine above a year old, he paid the lord one penny, which was also called thistle-take.

Thiva, or Stibes, in Geography, a town of European Turkey,
Turkey, in the province of Livadia, anciently called "Thbes," and the capital of Bæotia, situated on a rising ground between two small rivers, supposed to be the Ilmenus and Dirce of the ancients. (See Thb.) The town is of an oval form, about three miles in circumference, and the houses are higher and better built than is usual in most parts of Greece. It contains four or five thousand inhabitants, about half Turks and half Christians, which latter have several churches, not remarkable for any thing except some few inscriptions to be seen upon the pavement of the cathedral. The air of the country about Thbes is thick and foggy, whence the ancient inhabitants of Bæotia were accounted dull and phlegmatic, and were neither famous for their wit nor valor. (See Bæotia.) Epaminondas raised Thbes to its highest pitch of grandeur; after whose death it was not remarkable for its virtues, but misfortunes, till it sunk into its original obscurity; so that its glory took birth with this great man, and with him expired; 28 miles W.N.W. of Athens. N. lat. 38° 25'. E. long. 23° 34'.

THIVIERS, a town of France, in the department of the Dordogne; 7 miles N.W. of Exideuil.

THIULETIS-TSKALLI, a river of Georgia, which runs into the Kur.

THIZY, a town of France, in the department of the Rhone and Loire; 27 miles N.W. of Lyons.

THLALIAS, a term used by the ancients to express a cuunch made by a compreッション or contussion of the tcellles, not by the cutting them out.

THLALIS, a word used by the ancients to express either a contusion without a wound, or a wound made by some blunt instrument, which contused the parts.

THLALMA, a word sometimes used like thlasis, to express a contusion either with or without a wound; sometimes applied particularly to a recce of the cranium inward without a fracture, an accident principally afflicting children.

THLASEPOS SEmEN, in the Materia Medica, the name of a seed produced by the common thlaphi arvensi jiluquis latis, or common treacle-mustard. It used to be an ingredient in several of our shop compositions, and was esteemed attenuating, detereive, and aperient, and is said to promote urine and the menses, and to expel the after-birth.

THLASPIS, in Botany, θασπις, an ancient name, which Dioscorides tells us, in his book 2. chap. 186, originated in the broken, or panned, appearance of the seed, alluding, we suppose, to its smallness. The word therefore is derived from θασπι, a bruiser, or boat. He compares this seed to that of the κρατουσία, or Lepidium flavum, or Garden Cress, adding that the seed-velvett is moderately dilated upwars, the flower white, and the plant found about paths, walls, and banks. Every other part of his description, respecting the leaves and stems, is so apposite, that no doubt can remain of his θασπις being our Shepherd's Purse, which Dr. Sibthorp found common in Greece and the Archipelago, in the early spring. Linnaeus might freely have spared his mark of uncertainty concerning the etymology of the above name, in Philos. Bot. 183. But as he translates θασπι by the Latin word compresse, to compresse, he, most likely, had in view the Th. arvensi, which several old writers have taken for the plant of Dioscorides, and whose seed-velvett is very remarkably compresse.—Linn. Gen. 334. Schreb. 437. Willd. Sp. Pl. v. 3. 442. Mart. Mill. Dict. v. 4. Sm. Fl. Brit. 683. Compend. ed. 2. 98. Prodr. Fl. Græc. Sibth. v. 2. 7. Brown in Ait. Hort. Kew. v. 4. 80. Jull. 241. Lamarck Illusr. t. 557. Gerten. t. 141.—Clafs and order, Tetradynamia Silicula. Nat. Ord. Siliquose. Linn. Crucifere, Jull.

Gen. Ch. Cal. Perianth inferior, of four ovate, concave, somewhat spreading, deciduous leaves. Cor. cruciform, equal, of four obovate petals, twice the length of the calyx, with narrow claws. Stam. Filaments six, but half the length of the corolla, the two opposite ones flll shorter; anthers pointed. Pffl. Germen superior, roundish, compresse, emarginate; fyle fimple, the length of the rramens; fligins obtuse. Peric. Pouch compresse, inverely heart-shaped, emarginate, the flye being mostly the length of the notch in which it stands, of two cells, the partition lanceolate, and the valves boat-like, with more or less of a dilated keel. Seeds several in each cell, pendulous, inserted into the futures, roundish, compresse.


Obf. Mr. Brown has very happily separated from this genus the Linnaean Th. conpresse. That species, on account of its solitary feeds, properly belongs to Lepidium, to which genus it, as well as Th. birtuin, is removed in the new edition of our Compendium Fl. Brit. The fame ingenious botanist, of whose elucidation and reformation of the crucifom genera we have spoken under the article Tetradynamia, has founded a new genus, called Aethionema, upon Th. faska- tube, with another fpecies, whose pouch has no valves, and only a single feed. With this latter, a Spanish plant, we are unacquainted; but as the faska-tube has two cells, and many feeds, we can hardly either disjoin it from Thalpi, or unite it with this, though, it feems, they agree in having an unequal infection of their calyx-leaves, which in Thalpi is equal; and their longer filaments are either combined, or ellic toothed near the top. As there are but two fpecies, we presume one of these laft charactes belongs to each. The queftion feems at leaff doubtful, and therefore, without prefuming to form an opinion refpeccing Mr. Brown's Aethionema monopervatum, we prefer keeping his faska-tube where it is.

The plants of this genus are herbaceous, and most of them annual, with simple leaves, and numerous corymbose flowers; their surface more frequently smooth, and somewhat glaucous, than pubescent; fleem leafy and branched.

1. Th. peregrinum. Red Penny-Cress. Linn. Sp. Pl. 901. Willd. n. 1. Scop. Carn. v. 2. 17. (Th. capula cordata, peregrinum; Bauh. Hift. v. 2. 927, badly copied in Morif. feats. 3. t. 18. f. 30.)—Pouches roundish-heartshaped. Leaves lanceolate, entire.—Native of dry hills, above Heidenfchaf in Carniola. Scopoli. Of this very rare plant we have never seen a certain specimen. Scopoli says the ftemes are a fpan high, hard, branched, turning reddish, as well as the leaves, as they advance in age. The leafes grow on fhort ftalks. Flowers small, red, with entire ovate petals, and reddish filaments. Anthers yellow, as well as the fhort flyle, and the fligmat, which falt is flat at the top. Seed two in each cell, ovate, yellowith, slightly rugged, fitting, attached to the faleate partition.

2. Th. arabicum. Purple Arabian Penny-Cress. Vahl Symb. v. 2. 76. Willd. n. 2. (Th. humile, fipica purpu- recea; Buxb. Cent. 1. 2. f. 1. Iberis arabica; Linn. Sp. Pl. 905. Am. Acad. v. 4. Subularia purpurea; Forik. Ægypt.-Arab. 117.)—Pouch nearly orbicular, compresse, with a notch at each extremity. Lower leaves wedge-shaped; upper oblong-heartshaped, entire, clafping the stem.—Native of Arabia and Cappadocia.—The root is tapering, fibrous, annual. Stem more or less branched, round, smooth, from three to fix inches high, leafy, corymbo- fe. Leaves an inch long, acute, entire, smooth, rather succulent, slightly falked. Flowers small, purple or red-dish. Pouch light green, with a very broad fritated border, much exceeding the flyle, and notched at the bafe as well as fume.
**THLASPE.**

_somn. Seeds_ two in each cell. This species appears nearly related to the foregoing, nor should we be greatly surprised if they proved one and the same. If Baghania’s delineation of the pouch of the former be correct, they must be different.


4. _Th. alliaceum._ Garlick Ballard-Cress. _Linn. Sp._ Pl. 901. Willd. n. 4. Ait. n. 2. _Jacq._ Cc. Rar. t. 121. (Th. allium redolens; Morif. fect. 3. t. 28).—Pouch nearly obovate, tufted, with a narrow border. Leaves oblanceolate, obtuse, smooth, somewhat toothed. Native of the south of Europe. An annual herb, much resembling the laft, but the leaves are blunter, and less toothed. The pouches are very different, having but a flight border at their upper part only, their base being wedge-shaped.

5. _Th. Pscrinum._ Long-ryled Ballard-Cress. _Willd._ n. 5. (Physeinum lyllofa; Desfont. Atlant. v. 2. 60. t. 148. Burf. paflos hirufuta, erucce flore, filo proumiente; Shaw Afric. n. 91. f. 91.).—Pouch abrupt. Style prominent. Leaves heart-shaped-oblong, toothed, downy, clasping the stem. Native of the borders of fields in Barbary. Root annual. Herb larger than the foregoing, and clothed with hoary hairs. Leaves rounded, not acute at the base. Flowers pale yellow, as large as the Common Mustard. Pouch wedge-shaped, or triangular, being quite abrupt at the end; the style, which is as long as the whole pouch, fading prominent at the summit. Willdenow is certainly correct as to the genus.

6. _Th. fuscatic._ Rock Ballard-Cress. _Linn. Sp._ Pl. 901. Willd. n. 6. _Jacq._ Cc. Rar. t. 236. (Lithothalius quaternium, carnofo rotundo folio; _Col._ Ecpr. 279. t. 277. f. 2._Aethionema fasciatum; Br. in Ait. Hort. Kew. v. 4. 82.)—Pouch nearly orbicular; concave above; convex below. Stems mostly simple. Leaves linear-lanceolate, fleshy, obtuse. Native of dry hills, and the crests of rocks, in Italy, Austria, Switzerland, Greece, and the south of France, flowering in April and May. The root is perennial, and in some degree woody, though generally marked as annual. _Stems annual_, ascending, fix or eight inches high, round, leafy, rarely subdivided. _Leaves_ numerous, scattered, on short flanks, glaucous, smooth, entire, three quarters of an inch long; the lower ones rather elliptic. _Flowers_ small, pink, numerous, in dense terminal corymba, soon elongated into a lax _clefiers_ of glaucous pouches, tinged with pink, each on a slender, spreading, partial stalk; their border broad, atrivated, somewhat crenate, emarginate at the top only, where the minute _style_ is situated. The shrubby habit, glaucous hue, and very pretty little red flowers with a pale-green _calyx_, render this one of the most elegant plants of its natural order. _Hcris fuscaticus_; _Linn. Sp._ Pl. 905, distinguished from this by the accurate Fabius Columna, and figured in the fame place of his work, is fo like it, that they are hardly to be known at firder, except by the unequal _petals_, proper to _Hcris_, and the downiness of this latter plant. On a close comparison, the shapes and surfaces of their _seeds_, will be found effentially different.

7. _Th. montanum._ Mountain Ballard-Cress. _Linn. Sp._ Pl. 902. Willd. n. 9. Ait. n. 7. _Jacq._ Cc. Rar. t. 237. (Th. montanus, burf. paflos fructu; _Col._ Ecpr. 275. t. 276. f. 1. _Th._ precox; Wulf. in Jacq. Coll. v. 2. t. 124. t. 9. _Lepidium n. 518; Hal._ Halft. v. 1. t. 223. _f._ Th. alpinum; Jacq. Cc. Rar. t. 238. Willd. n. 10. _Crantz._ Cc. Rar. t. 25. t. 3. f. 1. (Th. minimum; _Arduin._ Spec. 2. 33. t. 15. f. 2.)—Pouch inerely heart-shaped. Leaves smooth, nearly entire; radical ones obovate, flaked; the _seeds_ clasping the stem. Petals three as long as the _calyx_. Stems simple.—Native of Rocky places, on the lofty mountains of Switzerland, Austria, Dauphiny, and Italy, flowering in April or May. The roots are perennial, long, subdivided at the summit, each trailing shoot crowned with a tuft of obovate _leaves_, rarely a little ferrated, their size, and the length of their _footstalks_, varying according to luxuriance of soil, or a more or less elevated place of growth. From the centre of each tuft arises a solitary, simple, ascending, or upright _stem_, from three inches to a span long, round, smooth, clothed with numerous, alternate, sessile, cordate, or arrow-shaped, very rarely toothed, _leaves_, whose base is more or less elongated and acute; their length three quarters of an inch. _Flowers_ in solitary terminal _corymba_, numerous, large, white and handfome; their broad, obovate, spreading _petals_ at least three as long as the smooth, often purplish, _calyx_. _Pouch_ tapering at the base; more or less deeply lobed at the end, with a _style_ almost as long as itself, projecting far beyond the lobes. _Seeds_ naturally two in each cell, as Jacquin describes them. Haller found one only. This may be accounted for from their being often abortive, as indeed are generally most of the _pouches_ themselves, the plant increasing much by root. Having had occasion to fludy this and the neighbouring species very minutely, in our investigation of Swiss and British plants, we can with confidence maintain the correctness of our synonyms, on the authority of original specimens. Our _b_ alone is entitled to be distinguished as a variety, and that an insignificant one, being merely rendered small in size by its very elevated or exposed situation. The faithful Jacquin himself evidently mistrusted this supposed species, though he says it retained the fame habit when cultivated.

8. _Th. oldebree._ Alpine Shepherd’s Purée. _Linn. Sp._ Pl. 903. Willd. n. 12. _Fl._ Brit. n. 5. _Engl._ Bot. t. 81. Ait. n. 6. (Th. folis globulares; _Rau._ Syn. ed. 2. 175. ed. 3. 309._Bau._ Halft. v. 2. 926. Th. montanum; _f._ ecundam badæfe; _Coll._ Halft. v. 2. 131. Th. albi supini varietas; Ger. _Em._ 268. f. 2. _Lepidium n. 519; Hal._ Halft. v. 1. t. 223, on the authority of specimens from Davall and Du Cros.)—Pouch obovate, abrupt, somewhat heart-shaped, with many seeds. Stem-leaves arrow-shaped. Stems simple. Style prominent.—Native of mountainous pastures in Switzerland and England, flowering in June and July. It abounds on limestone rocks, and about lead-mines, in Yorkshire and Derbyshire. Many authors have confounded this
THL

1. with the leaf, from which it differs in having a tufted root, not throwing out scions, or runners; usually taller and more numerous stems; more glaucous herbage; much smaller flowers, whose petals are erect, and though variable in dimension, never a quarter so large as in montanum; but above all, in having at least three or four seeds in each cell. The petals merely are always numerous, and all perfect. Their terminal lobes are variable in length or dilatation, but constantly much shorter than the style. (See the following.) We have often been inclined to remove from this species to the foregoing the synonyms of Baulin, Clatius, and Gerard, cited in Fl. Brit. on account of the large spreading petals of their figures. But this appears to be an inaccuracy on their part. The habit of their plant; several stems from the simple crown of the root; and the copious petals in long continued clusters, all properly belong to our alpestris, by no means to montanum. We have some suspicion that the alpestris is rather biennial than perennial. It never remains long in gardens, but that is no proof, nor have we had an opportunity of watching the plant through a season, on its own native hills. Hudson mitook the perforatum, next described, for alpestris.

9. Th. perforatum. Perfoliate Shepherd's Purse. Linn. Sp. Pl. 622. Willd. n. 11. Fl. Brit. n. 4. Eng. Bot. t. 2354. Jacq. Audl. t. 375; not. 237, as in Wildenow. (Th. alteran mimus rotundifolium, burfæ pastoris fructu.) Column. Ecphr. t. 278. f. 2. Th. rotundifolium; Ger. Em. 268. Th. cardo minus, flore albo, infulid.; Barrel. l. c. f. 815. Th. tertium pianulum; Cluf. Hift. v. 2. n. 131. Th. minus Clufi; Ger. Em. 268. Nafturium n. 510; Hall. Hift. v. 1. n. 220. Pilofera filiciflora; Thal. Harcyn. t. 7. f. C, at the end of Camer. H. (Pouch exactly inwards heart-shaped. Stem-leaves heart-shaped, sharpish at the base, clasping the branched stem. Style very short—Native of calcareous pastures or rocks, walls, and dry places, in Switzerland, Germany, France, Italy, Greece, and England, flowering in the spring. In the last-mentioned country it is hardly known any where but in the limestone part of Oxfordshire, about Witney and Burford. We have gathered it at Caferata, near Naples. The root is fibrous and annual. Stem branched from the bottom, except on poor ground, usually from four to fix inches high, round, smooth, leafy. Leaves glaucous, smooth, various in size, entire, or now and then slightly toothed; the radical ones flaked, ovate, obtuse; the reft fefile, alternate. Flowers white, small, with narrow, erect petals. Style fo short as to be scarcely discribable between the rounded lobes of the pouch. Sands three or four, at leaf, in each cell. The small annual root, usually branched stem, and minute style, are quite sufficient to distinguish this species from the leaf, with which it has been confounded; nor is it difficult, with a moderate degree of observation, to avoid the error of those old botanists, who defcribed its flared and luxuriant fronds for distinct species. Ray suspected this, and has adverted to it in his own frequent edition of the Synopsis, by far the moft exact, p. 176.

10. Th. teneum. Yellow Sicilian Shepherd's Purse. Bivon. Cent. i. 78. (Th. montanum, glafi folio, parvum, perfoliatus, noninhil ferratum, pilösula cordata; Cusan. Panphty. v. 2. t. 256. Th. montanum luteum, glafii folio, parvum, perfoliatus, noninhil ferratum, pilösula cordiformi; Cusan. Hort. Cathol. 212.)—Pouch inwards heart-shaped, nearly orbicular. Leaves toothed, the lowermost flaked; the reft clasping the stem. Style almost equal to the lobes of the seed-vessel.—Native of dry mountainous places near Palermo, flowering in April and May, and sent us by the baron Bivona. This is a fmall, smooth, glaucous, annual plant, from one to three inches high. Stem erect, either simple, or branched from the bafe. Leaves half an inch, more or less, in length; the lower ones fpatulate; the others ovate-oblong, bluntish, with a heart-shaped bafe; all having one or two large teeth at each fide. Flowers remarkable for being yellow. They are small, not many together, in short terminal corymbus, becoming elongated clusters of rather large, rounded, reticulated pouches, with a few seeds in each cell. The petals are emarginate, erect, longer than the calyx. S stigma large, on a level with the lobes of the pouch.

11. Th. Burfa Pafforis. Common Shepherd's Purse. Linn. Sp. Pl. 503. Wildl. n. 13. Fl. Brit. n. 6. Prodr. Fl. Grecq. n. 1409. Eng. Bot. t. 1435. Curt. Lond. f. c. 1. t. 50. (Burfa Pafforis; Ger. Em. 276. Matth. Valgr. v. 1. f. 521.)—Hairy. Pouch inwards heart-shaped, somewhat triangular, scarcely bordered. Radical leaves pinnatifid.—A very common weed in cultivated and waste ground, throughout Europe, as well as in North America, and in most countries where European merchandise or cultivation has reached. We have already mentioned that this species is indubitably the burfa of Dioscorides. It flowers at all times, from the beginning of spring to the end of autumn. The white tapering annual root is distinguished by a very peculiar nauseous smoke-like scent, when pulled out of the ground. Whole herb rough with flairy as well as prominent hairs. Stem various in height, erect, round, with alternate spreading branches, though sometimes fo flared as to be quite flimp and flender, with all the leaves of the plant undivided; in which state the species is difficult to be recognized. The radical leaves are numerous, close to the ground, variously pinnatifid, moftly toothed, somewhat lyrate, about two or three inches long; the reft linear-oblong, acute, fefile, entire or toothed, embracing the stem with their elongated heart-shaped bafe. Flowers small, white, in dense corymbus, often tinged with purplish-brown. Pouches smooth, fatchel-shaped, whence the modern name, difpoled in very long, lax, upright clusters. Style rather prominent. Seeds numerous, small, oval, a favourite food of small birds, as well as the flower-buds. The flavour of both is warm and pungent.

12. Th. ceraeocarpum. Horned Shepherd's Purse. Murray in Comm. Goett. v. 5. 21. t. 1. Linn. Suppl. 295. Wildl. n. 14. Ait. n. 3. Scop. Infub. v. 10. t. 4.)—Very smooth. Pouch obovate, tumid, with a terminal, double horn-like, comprised boder. Leaves lanceolate, somewhat toothed; arrow-shaped at the base.—Native of Siberia, from whence Pallas brought the seeds. The root is annual, tapering. Stem solitary, erect, twelve or eighteen inches high, leafy, moftly quite fimpie. Leaves all smooth, slightly toothed, or wavy; the radical ones obovate, on long falks; the reft fefile. Flowers numerous, white, very small. Pouches composing a long cluster, very confpicuous for their two sharp prominent horns, between which flonds the very short style. Seeds large, about two in each cell.

THLASPIDIUM, Gephisa of Crates, according to Tragus; a name whose etymology has been mistaken, like Thlapst, (fee that article,) from whence it is manifefly derived. Tournefort, who in his Inflitutiones 214, adopts this name, for what Linnæus more aptly termed Bisflculella, explains it as meaning that the plants which bore it were allied to Thlaspis; and this, no doubt, is correct. But Ambrofini, who confiders Thlaspis itself as applying to the beaten or flattened form of the seed-vessel, deduces the pre- sent word from thlasp, to bruife or beat, and ois, a little field, which is evidently applicable to the flat shield-like fruit of Thlaspis arvensis, and is fo plausible an explanation, that
THO

that it seems to have chiefly led the modern expounders of ancient writers to take this species for \textit{Saccitt} of Dioscorides. We have already, in its proper place, shown our Shepherd's Purse to be what he describes; and we can understand the name, as derived from \textit{Saw}i, \textit{Sawz}, in no other light, than alluding to the minute seeds, which seem as if beaten to powder. This is by no means the first instance, in which the most apparently just etymology, proves not to be the real one.

\textbf{THERIBIA}, in \textit{Antiquity}, a kind of cumachs. See \textit{Thalassas and Castratio}.

\textbf{THLIPIS}, \textit{Saccitt}, is used, by anatomists, for the comprehension of any vescel or aperture, by which its cavity is lined.

\textbf{THNETOPSYCHITIS}, composed of \textit{S RBI} the \textit{mortal}, and \textit{JX}, \textit{foul}, in \textit{Ecclesiastical History} ; a fell in the ancient church, who believed the foul of man perfectly like that of brutes; and taught that it died with the body. See \textit{Soul}.

We meet with no account of these heretics any where but in J. Domianus Hare. 10, unless they be the same with those Eufebius speaks of, Hist. Ecclef. lib. ix. c. 38, who relates, that in Origen's time, there were heretics in Arabia, who taught, that the foul of man died with the body; but that it should rise again with it at the end of the world. He adds, that Origen refuted them in a numerous council, and exclaimed them from their errors. St. Augustine and Isidore call them the Arabian heretics.

Marshall, in his table, uses the word \textit{Thromyphlactis} instead of \textit{Thonetopethritis}.

\textbf{THOA}, in \textit{Botany}, a Guiana name adopted by Aublet, and retained by Jussieu, and even Schreber; see our article \textit{Gnetum}, to which genus this plant is there, for the first time, referred, as a second species.

\textbf{THOALABIAN}, in \textit{Geography}, a town of Arabia, in the province of Nedsjed; 260 miles E.N.E. of Hajar.

\textbf{THOANOHA}, a town of Cochinchina, at the bottom of a large bay. N. lat. 16° 45'. E. long. 106° 27'.

\textbf{THOARD}, a town of France, in the department of the Lower Alps; 9 miles E.S.E. of Sitten.

\textbf{THOCO}, an island in the Grecian Archipelago, near the coast of Greece, about eight miles in circumference. N. lat. 37° 20'. E. long. 23° 21'.

\textbf{THOCOS}, \textit{Saccitt}, in \textit{Antiquity}, the name with \textit{Thacas}.

\textbf{THOGRAI}, in \textit{Biography}, a Persian of Ipahan, who was grand vizier to the sultan Malch Mahud, is celebrated for his poetical talents, a specimen of which is given by Pococke; and for a commentary upon the republic of Plato, to whom the Saracenps paid little attention. After a strange reverse of fortune, Thograil was put to death by order of the sultan in the year 1212.

\textbf{THOIRY}, in \textit{Geography}, a town of France, in the department of the Ain; 6 miles S.S.W. of Gex.

\textbf{THOSES}, in our \textit{Old Writers}, fifth with broken bellies, forbid by statute to be mixed or packed with tale-fish. 22 Ed. IV. cap. 2.

\textbf{THOLEN}, in \textit{Geography}. See \textit{Tolen}.

\textbf{THOLES}, in \textit{Sea Language}, denote small pins driven perpendicularly into the upper edge of a boat. In rowing, the oar passes between the two tholes, in the space called the \textit{row-lock}. Sometimes there is only one pin to each oar, as in the boats navigated on the Mediterranean sea: in that case the ear is hung upon the pin by means of a flap.

\textbf{THOMAENS, THOMAEANS, THOMITAE, or CHRISTIANS of St. Thomas}, a people of the East Indies, in Cochinn, and upon the coast of Malabar and Coromandel, who, according to tradition, received the \textit{Gospel} from the apostle St. Thomas.

It appears by the testimony of Cofmas, who wrote about A.D. 547, and whose work is translated by F. MONTFAUCON, that Christianity was established in India in the sixth century. We also find in the subscriptions of the council of Nice, that of a prelate, who calls himself bishop of Peria. Moreover, an ancient author, cited by Suidas, says, that the inhabitants of interior India, (a name which Cofmas gives to the coast of Malabar,) the Iberians and Armenians, were baptized under the reign of Constantine.

The princes of the country, and particularly Serant Peroumal, emperor of Malabar, the founder of the city of Calicut, A.D. 825, granted extraordinary privileges to these Christians.

When Valdo de Gama, the Portuguese admiral, arrived at Cochin with a fleet, in the year 1502, these Christians sent deputies to him, imploring his protection, and that of the king his master. The admiral treated them kindly, but was in no condition to afford them any effectual assistance, in relieving them from the yoke of the Pagan kings, to which they were then subject. The language they use is \textit{facris}, is the Syriac, or, as some say, the Chaldean; but their ordinary language is the same with that of their neighbours. The first missionaries, who attempted to profelyte them to the church of Rome, were Cordeliers, but their endeavours proved ineffectual. The distinguishing opinions and religious rites of these Christians are as follow.

They are charged with an invincible attachment to the doctrine of Neoforisus, and with an obdurate refusal to acknowledge, that the Virgin is the mother of God: they have no images in their churches: they believe that the souls of the blest are not admitted into the presence of God till after the day of universal judgment: they allow only of three sacraments, viz. baptism, orders, and the eucharist: they deler the baptim of infants for some time, as for a month, or even for seven, eight, or ten years, after they are born: they make no use of holy oil, neither in baptism, nor in the administration of the other sacraments; but after baptizing their infants, they sprinkle the oil of a species of Indian saffron all over their bodies: they allow of no auricular confession, treat purgatory as a fable, and their priests are permitted to marry: they entertain an extraordinary affection for the Nestorian patriarch of Babylon, but will not suffer any mention of the pope, or of the Roman churches in their assemblies. Their days of abstinence are Wednesday and Friday, and the rest is very severe in Lent, during which time they go to church three times a day. They also fast in the same manner during the time of Advent. Besides these two greater fasts, which are enjoined on pain of excommunication, they have several others of a religious nature. Their women do not enter a church for forty days after their deliver of a male child, nor for eighty days after the birth of a daughter.

These Christians are in general poorly instructed, knowing only the Lord's prayer and the angelical salutation. Their churches are mean and undecored buildings, and constructed after the manner of the pagodas. They appear to maintain many of the religious opinions and practices received among Protestants, and reject either wholly, or in a very great measure, those of the church of Rome. They deny the supremacy of the pope, and transubstantiation, and exclude from the number of sacraments, confirmation, extreme unction, and marriage. Such are the errors proferbed by the synod of Diamper, held in 1599, by Alexo de Menees, archbishop of Goa, in order to unite the Thomaeans to the Roman church. However, notwithstanding the temporary success that attended the vigorous exertions of the archbishop, for which he was recompened after his return to Europe, with the archbishopric of Braga, the viceroyhip of

4 A of
of Portugal, and the presidency of the council of state at Madrid, these Christians, oppressed and abused by the Jesuits, escaped from the church of Rome soon after the death of the archbishop; and notwithstanding the endeavours of Alexander VII. to conciliate them by the munificence of four bare-footed Carmelites, they could no more be reduced to submission. At length, when the Dutch took Cochin, in 1663, the Christians of St. Thomas recovered the liberty which they had formerly enjoyed; but they derived little advantage besides from their new masters.

Encyclopædia, and Gokkes's History of the Church of Malabar and Sum of Damper, in his Tracts, vol. v. For a further account of this fact, see Christianus of St. Thomas.

THOMAS, in Geography, a town of Portugal, in Erremadura, containing two churches, an hospital, four convenants, and about 2600 inhabitants; 63 miles N.E. of Lisbon. N. lat. 39° 34'. W. long. 8° 8'.

THOMAS, surname'd Dihymus, or the Tassian, in Scripture Biography, one of our Lord's twelve apostles, of whom the evangelist John has given a short account in the 20th chapter of his Gospel. John Chyfotom informs us, that Thomas preached the gospel to the Ethiopians, Parthians, Persians, and Medes, and even, according to tradition, to the Indians, and in the isles of Taprobana; and the Christians called after his name in the East, regard him as the founder of their church. See Christianus of St. Thomas, and Thomasians.

For an account of the pious gospel attributed to St. Thomas, we refer to the article Gospel.

Thomas, Antony Leonard, in Biography, a distinguished French writer, was born in the diocese of Clermont, in Auvergne, in the year 1732, and designed for the profession of the law; but his attachment to literature induced him to prefer a professorship in the college of Beauneus. His reputation as a man of letters recommended him to the office of confidential secretary to the duke De Pralifin, in which he conducted himself with integrity and honour. When he was advised by the duke to become a candidate for a seat in the French Academy, after having five times gained the prize for his compositions, and discovered that he was put forward as a competitor to Marmontel, who was out of favour with persons in power, he refused to be the instrument of such a design. In consequence of this circumstance, the duke defi-

miffed him his office, but procured for him the place of secretary-interpreter for the Swiss Cantons, to which a very considerable salary was annexed; and yet this was the whole benefit which he obtained from court-favour. His career as a writer commenced in 1756, by "Reflections historical and literary on Voltaire's Poème on Natural Religion;" and on all subsequent occasions he proved himself the friend of virtue, and a lover of mankind. His eulogies, particularly those on Des Cartes and Marcus Aurelius, were highly commended. His "Essai sur les Charactères, les Mœurs, et l'Esprit des Femmes," 1772, is a sprightly performance, in which fine writing and philosophical observation are combined. His "Essai sur les Eloges," in 2 vols. 1775, exhibits striking portraits with just ideas. As a poet, he appears to advantage in his "Épitre au Peuple," his "Ode sur les Temps," and his "Poeme de Junonville." His epic poem, entitled "Le Petreide," the hero of which was Cesar Petre, was left unfinished. He was distinguished by his singularities, and also by his sympathy with persons in distress, for whose relief he submitted to personal inconvenience and privation. His death took place at the seat of the archbishop of Lyons, in September 1785, at the age of 53. His works, in prose and verse, were published at Paris, in 7 vols. 8vo. Gen. Biog.

Thomas, Christian, an Eclectic philosopher of the German schools, who deserves notice on account of the boldness with which he threw off the yoke of human authority, and the perseverance with which, against much opposition, and in many vicissitudes of fortune, he maintained and exercised the right of free inquiry. He was born at Leipsic in the year 1655, and finished his course of education in the university of his native city. Upon a perusal of Puffendorf's Apology for rejecting the scholastic principles of morals and law, he renounced implicit deference to all ancient dogmas; and engaged in reading lectures on the subject of natural law, first from the text of Grotius, and afterwards from that of Puffendorf, in the full exercise of his own judgment, with prudent caution while his father lived, but after his death, with a boldness which incurred the violent resentment of theologians and professors. In 1687 he published an "Introduction to Puffendorf," in which he deduced the obligation of morality from natural principles, and thus gave great offence. In the following year he became still more unpopular, by commencing a monthly literary journal, entitled "Free Thoughts; or, Monthly Dialogues on various Books, chiefly new," containing a severe attack upon many of his contemporaries. Complaints of the raillery of this satirical work were lodged before the ecclesiastical court of Dresden; and Thomas with difficulty escaped punishment. Some other satirical pieces inflamed the resentment of his enemies, and he was charged before the same court by the clergy of Leipsic with a contempt of religion. Soon after he published another satirical work "On the Divine Right of Kings," "A Defence of the Sect of the Pilgrims," and some other eccentric works of the same general character, for which he was threatened with imprisonment; but obtaining permission from the elector of Brandenburg to retire, he became a voluntary exile from Leipsic; and soon after was appointed public professor of jurisprudence, first in Berlin, and afterwards at Halle. In these situations he indulged his satirical humour, and his inclination for controversy, as long as he lived; persevering in his endeavours to correct and subdue the prejudices of mankind, and to improve the state of philosophy. He died at Halle, in the year 1728. Thomas was the author of several treatises on logic, morals, and jurisprudence, in which he deviates from opinions generally received; and his latter publications are, in many respects, inconsistent with the former. His principal philosophical works are, "An Introduction to Aulic Philosophy; or Outhines of the Art of Thinking and Reaoning," Leipf. 1688; "Introduction to Rational Philosophy," 1692; "A Logical Praxis," Hal. 1691; "Introduction to Moral Philosophy," 1692; "A Cure for irregular Passions, and the Doctrine of Self-knowledge," 1696; "The New Art of discovering the secret Thoughts of Men," "Divine Jurisprudence," "Foundations of the Law of Nature and Nations," "Dissertation on the Crime of Magic;" "Essay on the Nature and Essence of Spirit, or Principles of Natural and Moral Science," 1699; and "History of Wisdom and Folly." As a specimen of the peculiar tenets and maxims of this eccentric philosopher, we shall subjoin the following.

"Thought arises from images impressed upon the brain; and the action of thinking is performed in the whole brain. Brutes are destitute of facnation. Man is a corporeal substance, capable of thinking and moving, or endowed with intellect and will. Man does not always think. Truth is the agreement of thought with the nature of things. The senses are not deceitful, but all fallacy is the effect of precipitation and prejudice. From perceptions arise ideas, and their relations; and from these, reasonings. It is impossible
to discover truth by the syllogistic art. No other rule is necessary in reasoning, than that of following the natural order of investigation; beginning from those things which are best known, and proceeding, by easy steps, to those which are more difficult.

"Perception is a passive affection, produced by some external object, either in the intellectual sense, or in the inclination of the will. Intclence is that without which a thing cannot be perceived. God is not perceived by the intellectual sense, but by the inclination of the will: for creatures affect the brain; but God, the heart. All creatures are in God; nothing is exterior to him. Creation is extension produced from nothing by the divine power. Creatures are of two kinds, passive and active; the former is matter; the latter, spirit. Matter is dark and cold, and capable of being acted upon by spirit, which is light, warm, and active. Spirit may subsist without matter, but defines a union with it. All bodies consist of matter and spirit, and have therefore some kind of life. Spirit attracts spirit, and thus sensibly operates upon matter united to spirit. This attraction in man is called love; in other bodies, sympathy. A finite spirit may be considered as a limited sphere in which rays, luminous, warm, and active, flow from a centre. Spirit is the region of the body to which it is united. The region of finite spirits is God. The human soul is a ray from the divine nature; whence it derives union with God, who is love. Since the essence of spirit consists in action, and of body in passion, spirit may exist without thought: of this kind are light, ether, and other active principles in nature.

"Good consists in the harmony of other things with man and his several powers. The highest felicity of man consists in tranquil delight. The fountain of this delight is the rational love of man and of God. Internal love and reverence are all the homage which nature teaches us to pay to God. With respect to God, the two capital errors are atheism and superstition. Superstition is worse than atheism. The love of God is a supernatural affection, which prepares the soul for future felicity. The rational love of man comprehends all social virtues. Rational self-love includes self-preservation, temperance, purity, industrious, fortitude. To wise men, virtue is its own reward. Laws are appointed for the sake of fools, to conduct them to internal tranquillity, and external peace. Of fools, there are three classes; those who disturb external peace; those who do nothing to promote it; and those who do not enjoy internal peace. The first have need of authority; the second of authority and counsel; the third of counsel alone. The obligation of authority and law extends only to external actions, which are just when they are conformable to law: justice is therefore to be distinguished from virtue, which respects the internal man, and requires a conformity to the law of nature."

Brucker by Ensfild, vol. ii.

THOMAS. Christians of St. Thomas. See Thomæns.

THOMAS'S Hospital. See Hospital.

THOMAS, S., in Geography, an island of the Atlantic, near the coast of Guinea, situated on the equinoxial line, of a circular form, about ten leagues in circumference, discovered by the Portuguez in the year 1640. The climate is salubrious, and at some seasons of the year the sky is even darkened by thick fogs, which are diffused by the winds that blow in the months of July and August. In this island the inhabitants have two winters, like those of other places that are under the same parallel, but without the cold that distinguishes that season in Europe. The rains continue from December to February; and spring begins with our summer, in the month of May. During the first three months of this period, the heat is insupportable, and the first settlers gradually inured themselves to the climate. The soil on this island is fertile and clayey, and mixed with chalk; but it is rendered fertile by the heavy night dews. The plants and shrubs, which it rapidly produces, are buried to ashes, and applied as the most beneficial manure to sugar-cane; which were first planted here by the Portuguez: in their endeavours to cultivate which they have been disappointed. Rice and millet succeed, and vines of the richest kind, as well as melons, cucumbers, figs, giner, and all sorts of roots, pulses, and pot-herbs, are cheaply reared, and they arrive at the utmost perfection. Yams are in this island a very wholesome and delicious diet. The land of this island is well watered, and much fertilized by its rivers and streams. In the centre is a high mountain, covered with wood and fruit-trees, whose summit is nevertheles always covered with snow. Its quadrupeds, birds, and fishes, are very various, and abundant; and St. Thomas would be equal to any spot in the globe, if its temperature corresponded to its other qualities. The inhabitants are the descendants of the Portuguez first settlers and the negroes, who are retained in the service of Europeans, and such as prefer a residence here to Angola. They are for the most part Roman Catholics, and extremely ignorant, superstitious, and bigotted. The ecclesiastical government is under the direction of the bishop, who is a suffragan of the archbishop of Lisbon. E. long. 8° 6'.—Alfo, a town of Hindoostan, on the coast of Coromandel. Here was formerly a powerful city, called "Meliapour," or "Melibour," the capital of the kingdom of Coromandel; but on the ruins of this city the Portuguez erected the lately city of St. Thomas. This is inhabited chiefly by weavers and dyers, who manufacture the best coloured ruffs in India. The Portuguez, who rebuilt this place in 1545, have raised it from a flat of defolation to a flourishing state, both with regard to its buildings and inhabitants. Whilft the Portuguez retained it, it was a bispopric under the archbishop of Goa; and they had several churches, besides monasteries, and a college for the instruction of the Portuguez and Malabar children. Here is also the famous church of St. Thomas the Apostle, where it is pretended that he was buried. (See Thomæns, and Christians of St. Thomas.) The city had seven gates, and was, on account of its situation, guarded by the sea on one side, and a chain of mountains on the other, very strong: nevertheless it was taken by the Moors after a long siege, and retained in their possession.—Alfo, a town of Germany, in the archduchy of Austria; 6 miles N.W. of Grein.—Alfo, a town of Savoy, in the county of Maurienne; 3 miles N. of Monfier.—Alfo, the principal of the Virgin Islands, in the West Indies, about six leagues in circumference, belonging to the Danes. It abounds with potatoes, millet, manioc, and mofl sorts of fruits and herbage, and especially sugar and tobacco, but is much exposed to the attacks of mosquitoes and other vermin. The English had formerly a spacious settlement in this island; and here is a safe and commodious harbour, with two natural mounds upon it, fitted for the reception of two batteries to guard its entrance. Nearly in the centre of the harbour is a small fort; and about 50 or 60 paces W. of it is the town, consisting chiefly of one long street, at the end of which is the Danish factory, with convenient warehouses. On the right side of this factory is the Brandenburgh quarter, containing two small streets, full of French refugees from Europe and the islands. Most of the houses are built of brick, and one story high. The trade of this small island is considerable, particularly in time of peace; as it is the staple for such articles of traffic as the French, English, Dutch, and Spaniards are not allowed to deal in publicly in their own islands; and
in war, their privaters bring their prizes hither for sale. N. lat. 12º 22'. W. long. 61º 30'.—Allo, the capital of Spanish Guiana, called "San Tomé," which is situated at the foot of a small mountain on the right bank of the Oro-noko. For its defence, a fort is placed opposite to the city and on the left bank of the river; it is surrounded by a number of houses, dependent, like the fort, on the province of Guiana. They call this place Port Raphael; and it is here the communication between Guiana and the provinces of Venezuela and Comana is found. Between Port Raphael and the city is seen the island called "Del Medio," or the Middle, because it is in the middle of the river. It is a rock, which, in its southern part, discovers itself in summer, and is under water in floods. The principal channel is between the city and this island: when the water is low it has 200 feet, and on the increase of the river 50 or 60 more.—Allo, a town of the United States of America, in South Carolina; 21 miles N. of Charleston.—Allo, a town of the island of Cuba; 130 miles W.S.W. of Havana.

Thomas de Caffite, St., a town of North America, in the government of Mexico, and province of Guatemala.

Thomas's Bay, a bay on the W. coast of Antigua.

Thomas's Creek, a river of South Carolina, which runs into the Great Pedee.

Thomas's Gulf, St., a bay on the Atlantic, on the W. coast of Africa. S. lat. 24º 50'.

Thomas's Head, St., a cape of England, on the N.W. coast of the county of Somerlet, at the mouth of the Severn. N. lat. 51º 20'. W. long. 73º 35'.

Thomas's Hospital. See Hospital. THOMASBRUCK, in Geography. See Thoms Bruck.

Thomasius, Jacobus, in Biography, a writer in history and philosophy, professor of eloquence in the university of Leipsic, and chiefly distinguished as the preceptor of the illustrious Leibnitz, was born at Leipsic in the year 1622. Having obtained distinction by his lectures and public theses in his native city, he was advanced to the office of co-rector, first of the college of St. Nicholas, and afterwards of that of St. Thomas. His erudition was extensive, nor was he less distinguished by his modesty and by his disinclination to controversy. Among his numerous works, the principal are "Antiquities of Philosophical and Ecclesiastical History;" "Dissertations on the Stoical Philosophy, and on other Subjects relating to the History of Philosophy;" and "A Dissertation on Literary Piagarium, with a List of 100 Plagiaries," all in Latin. He died in the year 1684. Brucker.

Moreri.

Thomasius, Christian, son of the preceding, an eminent jurist, was born at Leipsic in 1655. Having studied the law at Francfort on the Oder, he was made a doctor in that faculty in 1679; and returning to his native city, he attended the bar, and wrote some treatises on the law. He was the friend of Puffendorf. By opposing the scholastic philosophy in a German journal, commenced in 1688, he excited opposition, and raised against himself many enemies. Many circumstances occurred which increased the number of his adversaries, and at length he was denounced to the court of Dreden as a heretic and Calvinist. The dread of persecution induced him to withdraw to Berlin, and the King of Prussia offered him an asylum at Halle, where he intended to found an university. In this intitution he occupied the second chair of law, and on the death of Struycks, in 1710, he was advanced to the first chair. In 1713 he defended concubinage, and being denounced for this opinion by the theological faculty of Halle, orders were issued for proceeding against him criminally. But upon the examination of his theses, by commissioners, the proceedings against him were stopped. The dispute, however, continued; nevertheless he re-© to the post of privy-councilor to the king, and director of the university of Halle, and died in 1728. Moreri has given this character of Thomasius. "His views were vast; he aimed at the reformation of philosophy in general, and of the Peripatetic system in particular; and he unilaterally employed both the power of exhortation and the influence of example, in order to persuade the Saxons to reject the Arif- totelian system, which he had never read, and which most certainly he did not understand. The scheme of philosophy which he substituted in its place was received with little applause, and soon sunk into oblivion; but his attempt to overturn the system of the Peripatetics, and to restore the freedom of philosophical inquiry, was attended with remarkable success, made in a little time the most rapid progress, and produced such admirable effects, that Thomasius is looked upon, to this day, as the chief of those bold spirits who pulled down philosophical tyranny from its throne in Germany, and gave a mortal blow to what was called the sectarian philosophy in that country." Moreri's Eccl. Hist. Moreri.

THOMASSIN, Louis, an ecclesiastical writer, was born at Aix, in Provence, in 1619, and was admitted into the congregation of the Oratory in the fourteenth year of his age. He afterwards became professor of theology at Saintmur, and laying aside scholastic subtleties, adopted the method of teaching by the scriptures, fathers, and councils; and in 1654 he was called to the seminary of St. Magloire at Paris. His "Latin Dissertations on the Councils," were published by the desire of the archbishop of Paris, of which the first and only volume appeared in 1667, 4to. In the following year he published "Memoires fur la Grace," 3 vols., 8vo., in which work he attempts to conciliate the Greek fathers with St. Augustine. This was reprinted in 1682, with the addition of two memoirs. In 1678 he published the first volume of a work, entitled "De la Discipline Ecclesiastique," which was followed by a second volume in 1679, and a third in 1681. This work was translated into Latin, in 3 vols. fol., from respect to pope Innocent XI., and for the advantage of more unlimited circulation. His other works, which we can merely enumerate, were "Dogmata Theologic," 3 vols., 1680-89; "The Discipline of the Church and Christian Morality;" "On the Divine Service;" "On Feasts;" "On Fasts;" "On Truth and Falsehood;" "On the Unity of the Church;" "On Alms, Trade, and Usury;" "Methode d'enfeignir chrétienment la Grammaire, ou les Langues par rapport a l'Ecriture Sainte," 2 vols., 8vo.; and "Glosaire universelle Hebräique," which latter appeared after his death in 1697, folio.

Thomassin died in the year 1695, having for some time enjoyed a pension of 1000 livres granted to him by the French clergy, and of which he gave one half to the poor. One of his biographers characterizes him as "humble, modest, and mild, fond of study and retirement, and fuming disputes."—Although his reading was extensive, his erudition was not of the highest class, and it is said that his work on Discipline contains many mistakes where Greek authors are cited. Moreri. Gen. Biog.

THOMASTOWN, in Geography, a post-town of the county of Kilkenny, Ireland, situated on the river Nore, over which it has a fine bridge. The castle was built about 1180, by Thomas Fitzsaltanthy, from whom the town takes its Irish name of Ballymac-Andan; i.e. town of Anthony. It was a borough, and sent two members to parliament, but lost that privilege by the Union. The Nore is navigable to this town for
THOMISM, or THOMISM, the doctrine of St. Thomas Aquinas, and his followers the Thomists, chiefly with regard to predestination and grace. See his biographical article.

There is some doubt what the true, genuine Thomism is: the Dominicans pretend to hold pure Thomism; but there are others who distinguish the Thomism of St. Thomas from that of the Dominicans.

Others, again, make Thomism no other than a kind of Jansenism dilugued; but Jansenism, we know, has been condemned by the popes, which pure Thomism never was.

In effect, the writings of Alvarez and Lemos, were appointed, by their order, to lay down and defend before the holy see, the dogmata of their school, have since been reputed the rule of pure Thomism.

Those two authors distinguish four classes of Thomists: the first, which they reject, destroys or takes away liberty; the second and third do not differ from Molina. The lat, which Alvarez embraces, admits a physical premonition, or predetermination, which is a complement of the active power, by which it palies from the first act to the second; that is, from complete and next power to action.

This promotion, they hold, is offered in sufficient grace: sufficient grace is given to all men; and that they have a complete, independent, next power not to act, and even to reject the most efficacious grace.

THOMISTS, a sect of school divines, who maintain Thomism.

The avowed antagonists of the Thomists are the Scotists.

THOMITES. See THOMISTS.

THOMMDAMM, in Geography, a town of the duchy of Saxe Lauenburg, on the Elbe; 25 miles S.E. of Lauenburg.

THOMPSON, Sir Benjamin, Count of Rumford, in Biography, distinguished by his industry and zeal in the promotion of science, and in devising and executing schemes of public utility, was born at the village of Rumford, in New England, in the year 1752; and with the assistance afforded him by a professor of natural philosophy in the American University of Cambridge, acquired in early life such a degree of knowledge as enabled him to give instruction to others. By an advantageous marriage, while he was young, his advancement was accelerated, so that he obtained the rank of a major in the militia of his native district. When the war broke out between the mother-country and her colonies, he took part with the former, and by means of his local knowledge, he rendered himself useful to the British generals in America. In course of time he repaired to England, and recommending himself to Lord George Germain, the chief minister in the American department, he obtained a place in his office. Towards the close of the war, the same nobleman, with a view of securing for him a permanent provision, sent him to New York, where he raised a regiment of dragoons, and by being appointed lieutenant-colonel, became entitled to half-pay. Upon his return to England, his majesty, in 1784, conferred upon him the honour of knighthood; and for some time he occupied the post of one of the under-secretaries of state. Soon after he made a tour to the continent, and being warmly recommended by the prince of Deux-Ponts, afterward king of Bavaria, to his relation the reigning elector-palatine, and duke of Bavaria, he was admitted into his service, and occupied an eminent station. He had thus an opportunity of effecting many important and useful reforms in the departments of the state, both civil and military. His attention was at this time particularly directed to the suppression of mendicancy, which prevailed not only at Munich, the capital, but through the whole country, to an extent that rendered the restraint and abolition of it a very difficult and hazardous undertaking. With this view he formed a plan for employing all mendicants; and having provided a building for their reception, and materials for their labour, he fell into the streets of the city on the 1st of January 1790 (New-year's day being set apart for giving alms in Bavaria), accompanied by the field-officers of the garrison and the magistrates of the city; and arresting with his own hand the first beggar that came in his way, his attendants followed his example, so that before night not a single beggar was to be seen in the whole metropolis. Those that were arrested were conducted to the town-hall, where their names were inscribed, and then ordered to repair to the work-house, where they would find employment, and a sufficiency of wholesome food. In consequence of these prompt and vigorous measures, the evil was redressed, and the mendicants were led by habit to prefer industry to idleness, and decency to the fifth, rags, and squalid wretchedness attendant on beggary. He also introduced into Bavaria the culture and use of potatoes. For all these services Sir Benjamin was decorated by the Bavarian sovereign with several orders, promoted to the rank of lieutenant-general, and created a count by the title of his native place, Rumford. During his abode at Munich, he commenced his experiments upon the improvement of fire-places, with respect to the economy of fuel, and the convenience of cooking; and also his plans for a cheaper and more nutritious mode of feeding the poor, which gave him peculiar celebrity. Having quitted Bavaria in 1799, he resided for some time in this country, pursuing a variety of experiments on the nature and application of heat, and the construction of chimneys, grate, and fire-places. He also promoted science both by his own researches and experiments, and by liberally exciting emulation in others, upon a more enlarged plan. For the latter purpose, he transferred, on an occasional visit to this country in 1796, to the Royal Society of London, of which he was a member, 1000l. 3 per cent. Rock, the interest of which was to be applied every second year as a premium to the author of the most important discovery on the subjects of heat and light in any part of Europe during the two preceding years; the preference to be always given to such discoveries as, in the opinion of the president and council, tend most to the benefit of mankind; which indeed was the leading object of all his researches. He also suggested the plan, and assisted in the formation of the Royal Institution, which has produced several other establishments of a similar nature.

In the year 1802 he left England for Paris, which became his fixed residence, and where he married the widow of the celebrated chemist, Lavoisier; but this connection proving unhappy, it was soon terminated by a separation. The count afterwards retired to a country-house at Auteuil, about four miles from Paris, which he rendered a delightful habitation. Besides the improvement of his grounds, in which he took great pleasure, he pursued a variety of philosophical and mechanical researches. With his superior talents he combined certain peculiarities, and a tenaciousness, not to call it obstinacy, of temper, which prevented his enjoying the pleasures of social intercourse. Although he disapproved both the character and politics of the French, he preferred their climate to every other; and he obtained permission from the king of Bavaria to continue in France, and to enjoy his pension of 1200l. a year. He lived in a state of retirement, and also in a course of abstruse researches, which
which debilitated his constitution, and rendered it incapable of resisting an attack of small fever, by which he was carried off in August 1814, in his 63d year. By his first wife he had one daughter, now resident at Boston.

Although Count Rumford was not a learned man, he acquired by his knowledge of the French and German languages, and by his extensive acquaintance, and frequent conversation with literary men, a large stock of literature and science. His peculiar talent was that of contriving instruments, and devising experiments for facilitating his researches in those branches of economics and scientific philosophy to which his attention was directed. He was also distinguished by a readiness and perseverance of pursuit, which were favourable to the attainment of the objects which he had in view. As to his person, his stature was above the middle size, his countenance was dignified and pleasing, and his manner and tone of voice mild and gentle. He was, nevertheless, ambitious of distinction, and too prone to dictate in transactions with regard to which other persons were jointly concerned with himself. The papers which he communicated both to the Royal Society and French Institute, and which are published in their Transactions and Memoirs, are numerous. The only separate publication of count Rumford was a series of "Essays, Experimental, Political, Economical, and Philosophical," commencing with the year 1796, and continued to 1799 in number, and occupying 4 vols.

THOMPSON, in Geography, a town of America, in the state of New York, the capital of Sullivan county; bounded N. by Wawarsing and Neverlink, E. by Mamakating, S. by Deerpark in Orange county, and W. by the Montauk, which separates it from Long Island, Bethel, and Liberty. Its length N. and S. is about 34 miles, and breadth 12. The principal settlements are Thompson, Monticello, Bridgeville, and Concord. The whole area of Thompson is 135,500 acres; and the population by the census of 1816, consisted of 1290 persons. The principal streams are the Neverlink, Montauk, and Sheldrake. Also, a township of Connecticut, in the county of Windham; 20 miles N. W. E. of Windham: the place contains 2457 inhabitants.

THOMPSON'S Creek, a river of South Carolina, which runs into the Atlantic, N. lat. 34° 44'. W. long. 79° 46'. Also, a river of West Florida, which runs into the Mississippi, N. lat. 30° 50'. W. long. 91° 30'.

THOMPSON'S Harbour, a harbour in Hudson's Bay. N. lat. 60° 20'. W. long. 78°.

THOMPSON'S Island, a small island of Upper Canada, at the entrance of the river St. Claire.

THOMPSON'S Borough, a town of America, in the district of Maine; 30 miles N. E. of Portland.

THOMS, a town of Hungary; 11 miles S. W. of Camnica.

THOMSON, James, in Biography, a popular English poet, was born at Ednam, near Kelso, in Scotland, in the year 1720, being one of the nine children of the minister of that place. Whilst he was at school at Jedburgh, he manifested no powers superior to those of other boys, except in a taste for poetry, which he betimes indulged, and which introduced him, during his vacations, to the society of some neighbourly gentlemen. Of his productions, however, he thought so humbly, that on New-year's day he committed to the flames those of each preceding year. From Jedburgh he was removed to the university of Edinburgh, where he persevered in the cultivation and exercise of his poetical talents; but upon the death of his father, he complied with the wishes of his friends by entering on a course of divinity. His probationary exercise was the explanation of a psalm, which was written in a style so splendid, as to incur reproof from the theological professor, as being altogether unfuitable to the audience which might probably attend his future ministry. Having no great inclination for the office, this admonition induced him to devote himself entirely to poetry: and after spending some time as private tutor in the family of Lord Binning, he determined, at the suggestion of a lady, who was his mother's friend, to try his fortune in London. In 1725 he came to London, and meeting with his college acquaintance Mallet, he shewed him his poem of "Winter," in an imperfect state; who advised him to finish and publish it. Mr. Millar, a well-known London bookseller, bought it for a small sum, and published it in 1726. At first it attracted little attention; but Mr. Whateley, a gentleman of acknowledged talents, giving a favourable account of it, brought the poem and its author into notice. The author was introduced to Pope, and recommended by bishop Rundle to lord chancellor Talbot. In 1727 he published his "Summer," and in the same year "A Poem faced to the Memory of Sir Isaac Newton," just deceased, and also his "Britannia." His "Spring" was published in 1728; and in 1730 the Seafons were completed by "Autumn," and published collectively. In 1738 Thomson, aspiring to the popularity and emolument of dramatic composition, succeeded in introducing upon the stage of Drury-lane his tragedy of "Sophonibla." Its reception, however, was not very flattering. Soon after he was appointed, by the recommendation of Dr. Rundle, travelling companion to the Hon. Mr. Talbot, the eldest son of the chancellor, and had an opportunity of visiting most of the courts and countries of the European continent. During this tour, the idea of his poem on "Liberty" was suggested to him, and he employed two years in completing it. In consequence of this excursion, he obtained, by the intered of Mr. Talbot, the place of secretary of the briefs, which, being almost a sinecure, afforded him leisure for his private literary pursuits. His poem on "Liberty" was more quietly received than the nature of the subject led him to expect. When lord Hardwick succeeded the lord chancellor Talbot, Thomson lost his place; but upon being questioned by the prince of Wales, to whom he was introduced, by Mr. (afterwards lord) Lyttelton, as to his circumstances, a pension of 100l. a year was granted to him.

Upon the introduction of his second tragedy, "Agamemnon," to Drury-lane, in 1738, he was so anxious concerning its success, that he is said to have been thrown into a cupulous periphrasis. His "Edward and Eleonora" was prevented from appearing by the interference of the lord chamberlain. The "Marlow of Alfred," performed before the prince at Cliefden-bouge, in 1746, was the joint production of himself and Mallet; and in this piece was introduced the famous song of "Rule Britannia," the composition of one or other of these two persons. The most successful of Thomson's dramatic pieces was his "Tancred and Sigismunda," which appeared at Drury-lane in 1745; but his "crowning performance," as one of his biographers calls it, was "The Castle of Indolence," published in 1746. Our poet was now rendered independent by the interest of Mr. Lyttelton, who obtained for him the office of surveyor-general of the Leeward islands, which, after payment of a deputy, yielded him about 300l. a year. Death, however, in consequence of a fever occasioned by a cold, deprived him, in August 1748, of the comparative affluence derived from this appointment. His remains were interred in Richmond church, without any memorial; but in 1762 a monument was erected in Westminster Abbey, the expense of which was defrayed out of the profits of an edition of his works, published by Mr.
Mr. Millar. His "Coriolanus" was brought on the stage by his executors, in 1749, for the benefit of the surviving branches of his family. The prologue, composed by Lyttelton, was very feebly delivered by Quin, the intimate friend of Thomson.

Thomson's person was large and awkward, and his countenance unanimated; nor did his appearance or manner indicate genius or refinement. With select friends, however, he was gay and cheerful, and universally beloved for the kindness of his heart, and freedom from those passions that sometimes disgrace men of literary character. He was indolent and self-indulgent in his habits; although "no poet," as his biographer says, "has deferred more praise for the moral tenor of his writings. Unbounded philanthropy, enlarged ideas of the dignity of man, and of his rights, love of virtue, public and private, and a devotional spirit, narrow by no views of sect or party, give soul to his verse when not merely descriptive; but no one can rise from the perusal of his pages without melioration of his principles or feelings." His poetical merit is most confinuous in his "Seasons," and though Dr. Johnson charges it with a defect of method, yet as a history of the year through its changes, depending upon the vicissitude of the seasons, it adheres sufficiently to its general plan for preserving a continuity of subject, with due allowances for the moral and philosophical digressions by which it is varied. Its dictum, though somewhat laboured, is energetic and expressive. Its verification, though it does not indicate a nice ear, is seldom unpleasantly harsh. Upon the whole, continues the biographer now cited, "feerely any poem has been more, and more deservedly, popular; and it has exerted a powerful influence upon public taste, not only in this country, but throughout Europe. Thomson's other pieces in blank verse display a vivid imagination, a comprehensive underlaying, and exalted sentiments, but are not marked with any peculiar character. The addition to his fame as a poet has principally arisen from his "Cattle of Indolence," an allegorical composition in the manner of Spenser." Of his tragedies, the best that can be said is that they maintain a respectable rank among the productions of the modern school of the drama, which, when they disapper from the stage, are seldom taken up in the closet. Murdoch's Life of Thomson. Johnson's Lives of the Poets. Gen. Biog.

THONE, in Geography. See TONE.

THON, in Agriculture, a term signifying somewhat damp and cold, not thoroughly dry. Also fluid or limber, as undried hay, corn, or straw in a moist flafe.

THONGTONG, in Geography, a town of the Birman empire; 10 miles N.W. of Raynangong.

THONNA, a town of Saxony, in the principality of Gotha; 12 miles from Gotha.

THONNAUSTAFF, a town of Bavaria, near the Danube; 3 miles from Ratibon.

THONNES, or THONNEX, a town of France, in the department of the Leman; 9 miles S.E. of Annecy.

THONON, or TOXON, a town of France, in the department of the Leman, late capital of the duchy of Chablais, on the lake of Geneva, situated on a plain a little elevated. It is not envioned with walls, but was formerly defended by a strong castle, surrounded with lofty towers, where Amadeus VIII. and IX. and Louis, dukes of Savoy, resided for some time. The castle was burned and demolished, in the 16th century, by the Bernois. It has one parish church and several convents; 18 miles N.E. of Geneva. N. lat. 46° 18'. E. long. 6° 32'.

THOPH. See MACHUL and SISTRUM.

THOPHAILE, ABU CIAPAR, in Biography, a celebrated Peripatetic philosopher and physician, was a native of Seville in Spain, and preceptor to Maimonides and Avemroes. This philosopher employed the Ariflotian doctrine to the purposes of enthusiasm, in the elegant tale ill extant of "Hai Ebr Yockdan?" a youth who, having been exposed when an infant on the sea-coast, was nourished by a hind, and grew up in the woods, without any intercourse with human beings; and who, by the unaided exertions of his own powers, attained to the knowledge of things natural and supernatural, and arrived at the felicity of an intuitive intercourse with the divine mind. This piece is written with such elegance of language and vigour of imagination, that, notwithstanding the improbability of the story, it has been universally admired. It exhibits a favourable specimen of Peripatetic philosophy, as it was taught among the Saracens; and, at the same time, affords a memorable example of the unnatural alliance, which was now so generally established between philosophy and fanaticism. This work was translated by Edward Pocock, jun. from the Arabic into Latin, under the title of "Philosophus Autodidactus," and printed in 1601 at Oxford, in 1700. It was also translated into English by S. Hoadley, professor of Arabic in Cambridge, ed. Lond. 1711, 5vo., and also into Dutch. Thophaile is said to have written several other works, and died at Seville in 1175. Brucker by Enfield. Gen. Biog.

THOR, in Mythology, a deity worshipped by the ancient inhabitants of the northern nations; particularly by the ancient Scandinavians and Celts. Julius Caesar (Com. lib. vi. c. 17.) speaks of a god of the Gaals, who was charged with the conduct of the atmosphere, and presided over the winds and tempests, under the name of Jupiter; but Lucan gives him a name, which bears a greater resemblance to that of Thor, viz. Tarantus, a word which, to this day, in the Welsh language, signifies thunder. The authority of this deity extended over the winds and seafons, and particularly over thunder and lightning. In the sytem of the primitive religion, the god Thor was probably one of those genii, or sibyls, sprung from the union of Odin, or the supreme Deity, and the Earth. The Edda calls him the most valiant of the sons of Odin; and in the Icelandic mythology, he is considered as the defender and avenger of the gods. He always carried a mace, or club, which, as often as he discharged it returned to his hand of itself; he grasped it with gauntlets of iron, and was poffessed of a girdle which had the virtue to renew his strength as often as was needful. With these formidable arms he overthrew the mounlers and giants, when the gods sent them to oppose their enemies. Thor, Friga, or Freyja, and Odin, composed the court or supreme council of the gods, and were the principal objects of the worship and veneration of all the Scandinavians. The Danes seem to have paid the highest honour to Odin. The inhabitants of Norway and Iceland appear to have been under the immediate protection of Thor; and the Swedes chose for their tutelar deity Freyja, or Frey, an inferior divinity, who, according to the Edda, presided over the seafons of the year, and bellowed peace, fertility, and riches.

There was a day consecrated to Thor, which still retains his name in the Danish, Swedifh, English, and Low Dutch languages, viz. Thursday. This word has been rendered into Latin by dies Jovis, or Jupiter's day; for this deity, according to the ideas of the Romans, was the god of thunder. Mallet's North. Ant. vol. i. p. 95.

THOR, Le, in Geography, a town of France, in the department of the Mouths of the Rhone; 9 miles E. of Avignon.

THORA, a town of Hindostan, in the circuit of Rantamour; 45 miles S. of Rantamour.

THORA,
THORA, in Botany. See Aconitus.

THORACIC, in Anatomy, an epithet applied to various parts in and about the chest, as to the aorta above the dia-
phragm, and to some branches of the axillary artery (see Artery); to some branches of the axillary plexus of nerves (see Nerve); to the trunk of the absorbing system of vessels. See Anomeraents.

THORACICI, in the Linnæan System of Ichthyology, the name of the third order of bony fishes, respiring by means of gills only; the character of which is, that the bronchia are oblique, and the ventral fins are placed underneath the thorax. This order in Gmelin's edition of the Linnæan system, includes nineteen genera, and a good number of species. The genera are, the cepala, cebene, coryphaena, gobius, cottus, scophena, zeus, pleurometes, chabdo, sparus, scarus, labrus, seiana, perca, saltuscolus, flomer, centrogofer, mullet, and tripla.

THORÆ RADIX, in the Materia Medica, the name of a root which keeps its place in the catalogues of official simples, but is seldom used. See Aconitus and An-
thora.

The plant which produces it is the thoræ Waldensteii of Gerard. It is kept in the gardens of the curious, but grows wild in the mountainous parts of Germany. The root is composed of a number of granules or small lumps, like that of the common ranunculus; the leaves are roundish, and stand on small pedicles, and the flaks are about six inches high, and the flowers yellow, and like those of our common wild ranunculuses.

The root is acrid and corrosive, and the juice of the leaves is said to poison animals, and to have been used by the ancients for that purpose.

THORAME, in Geography, a town of France, in the department of the Lower Alps; 13 miles E. of Digne.

THORAX, in Anatomy, that division of the skeleton which contains the bones forming the cavity of the chest; or it is used to denote the cavity of the chest. See Lung, where the bones and their articulations are described, as well as the cavity they form, and its contents.

THORAX. For an account of the operation of tapping, refer to Empyema, Paracenthes, and Wounds of the Thorax.

The subject of wounds of the chest will be found in the article Wounds.

THORDO, DIACONUS OR LEGIFER, in Biography, de-
scended from an ancient family, was provincial judge in North Jutland, and flourished in the time of Waldemar III., or about the year 1340. He was the author of the following work; "Constitutio Voldemari Regis, per Thordem Regiferum, &c." Ripis, 1564; et Hav. 1568, 4to; translated into Latin together with Waldemar's Jutland Laws, and afterwards pub-
lished in Ludwigs' "Reliquiae MSS." tom. xii. and also in German by Eric Krabbe, in "Weltphal's Monuments." Gen. Bio.

THORDSEN, or THEODORI STURIA, called also Frode or Polyhjoter, was born in Iceland, about the beginning of the 13th century. His father was Thordur Sturison, brother to the celebrated Snorro. (See Sturluson.) He is represen-
ted to be one of the greatest Icelandic poets of his time, as well as an eminent lawyer and historian. His talents excited enemies, so that he was forcibly carried away from the island in 1263, and conveyed to Norway, where he was favourably received by the king Magnus Lagebeater, ad-
mitted into his council, and appointed his historian and da-
pifer, one of the highest offices at the Norwegian court. Afterwards, however, he returned to Iceland, and having been chief justice of the country for many years, died in

1284. His works are "Landnana Saga," or "Libor Ori-
ginum Islandie," published entire by bishop Thordur Thor-
fakar, Skalholt, 1688, 4to., and by J. Finnezus, Hav.

1774, 4to.—A continuation of "Sturlunga Saga," or the history of the Sturia family, and almost the whole of Ice-
land, during his time, which was begun by the learned bishop Brand:—" The History of King Haager Haagen-
fen," published at the expense of the crown-prince Frede-
ric:—" The History of King Magnus Lagebeater," com-
piled from the public records of the kingdom, the greater part of which has been lost. Gen. Bio.

THORESBY, RALPH, an eminent antiquary, the son of a considerable merchant of an ancient family at Leeds, where he was born in the year 1658. His father belonged to the body of Presbyterians, and being addicted to anti-
quarian studies, founded the collection entitled "Museum Thorubresianum." The subject of this article was intended for a mercantile profession; and in order to complete his edu-
cation, begun at Leeds, and prosecuted in London, he was sent, in his twentieth year, to Rotterdam, to acquire the Dutch and French languages. But his father dying in 1679, he succeeded him in business, married, and settled in his na-
tive town. To antiquarian researches, for which his father's example had given him an early taste, he devoted much time and attention. In the earlier period of his life he had been an occasional confidant, in common with many of those who were called Dilleniers, and disgrusted by the indiscriminate zeal of his patron in mature life, as well as probably influenced by his diocesan, archbishop Sharp, he joined in full commu-
nion with the established church. His connection and cor-
respondence with persons engaged in similar pursuits with his own were gradually enlarged; and upon communicat-
ing, by Dr. Martin Lijfer, an account of some Roman anti-
quities discovered in Yorkshire, to the Royal Society, he was admitted a member of that learned body in 1697. In 1714 he published a work in which he had been long engaged, containing a history of his native town, and entitled "Du-
tus Leodenis; or the Topography of Leeds, and Parts adja-
cent," together with a catalogue of the antiquities, &c. contained in the Museuim Thorubresianum. An historical part, to which he often refers, and comprehending a view of the state of the northern districts of this kingdom in remote ages, was left in MS. continued to the sixh century; which MS. being communicated to the editors of the Biographia Britannica, was by them printed entire in the article "Tho-
rebey." He published also "Vicaria Leodenis, or the His-
story of the Church of Leeds," Lond. 1724, compr-
prehending observations on the origin of parochial churches, and the ancient manner of building them, together with biographical memoirs of several clergymen. In the fol-
lowing year he was feized with a paralytic affection, which ter-
minated his life at the age of sixty-eight years. Possessing an extensive acquaintance with the history of his country, genealogy and heraldry, and ancient coins and medals, he was always manifestly disposed to assist those who were en-
gaged in works of the antiquarian and biographical descrip-
tion. The sentiments of Mr. Thorubey were liberal and Catho-
lic; his manners regular, and his discharge of social and religious duties exemplary. Gen. Bio.

THORIGNY, in Geography, a town of France, in the department of the Channel; 6 miles S.E. of St. Lo.—
Also, a town of France, in the department of the Yonne; 18 miles S.S.E. of Provins.

THORLASKEN GUDBRAND, in Biography, an Ice-
landic writer and prelate, was born at Stadarakke, in the diocese of Holm, in 1542. In 1561 he was sent to the university of Copenhagen; in 1564 he became rector of the school.
school of Holm; and in 1570 he was appointed bishop of that diocese. With a view of diffusing knowledge, he established a printing-press, first at Rupenfel, and afterwards at Holm, which he personally superintended. He was one of the most learned of the Icelandic Bishops, but too arbitrary in the exercise of his episcopal functions. He died in 1629, in the 87th year of his age. Many considerable works, partly his own, and partly those of others, issued from his press. He also constructed a map of Iceland, which was engraved by Ortollus. Gen. Biog.

THORN, in Geography, a city of Prussia, situated on the Vistula, formerly the chief city of Polich Prussia. It was founded by Herman Bolek, first grand-master of the Teutonic order, who built the castle of Thorn in 1235. In the following year, the foundation of the town was laid; but the building was discontinued in 1235, on account of the inconvenient situation, and Thorn was built about a German mile farther up the river, on the spot where it now stands. It is supposed to have been called Thorn, because the knights of the Teutonic order, by building this city, opened themselves a thor or door into Prussia. When the knights of the Teutonic order enormously abused their power throughout all Prussia, Thorn was the first city which formed the noble scheme of shaking off their oppressive yoke. The inhabitants then put themselves under the protection of Casimir the Great, King of Poland, upon advantageous conditions, as a free city. Thorn has ten gates, and is divided into the Old and the New Town, each of which had formerly its respective council, magistracy, and police. But, in 1454, they were incorporated into one city. They are, however, separated from each other by a wall and moat within the town; and without, they are defended in common by a fine double wall and moats. Thorn was formerly strongly fortified; and it gradually improved its advantageous situation, so as to become a place of very considerable trade, and one of the principal of the Hanse towns. It likewise carried on an extensive commerce in the Baltic, independently of the other cities of that confederacy, for before the river widened so much, and consequently became shallower, ships of burden could come up to the very city. From various causes, in little more than half a century, Thorn greatly declined from its flourishing condition; for it surrendered by capitulation, in 1655, to Charles Gustavus, king of Sweden; and, in 1658, after a vigorous siege, it was taken by the Poles and Brandenburger. In 1793, it was bombarded and taken by Charles XII. king of Sweden, who not only extinguished it by the heaviest contribution, but also demolished all the fortifications, contrary to the articles of capitulation. Between the years 1708 and 1710, great numbers of its inhabitants were swept away by the plague. In the following years, the revenues of the city suffered considerably by the confederations in Poland, and no less by the commotions occasioned by the competitors for the crown of that kingdom. In 1793, some Prussian troops entered this town, and from that time it has formed part of the dominions of that king; the king of Prussia taking possession of Thorn and Danzig, together with the palatinate of Posenia, Kalisz, &c. agreeably to a proclamation, published on the 25th of March. The loaf, ginger-bread, &c. of Thorn, are every where in great request; and, accordingly, great quantities of them are exported. The apple-juice that grows wild on some of the city lands, is not inferior to that which is cultivated with so much care in other countries; 70 miles S. of Danzig. N. lat. 52° 55'. E. long. 18° 30'.

THORN, or Thoren, a town of France, in the department of the Lower Meuse. It had a noble abbey, whose superior was a princess. This abbey was affeles in the matricula at one horse or twelve florins; 7 miles S.W. of Ruremond.

THORN, in Botany, a name generally given to all trees, or the larger kinds of shrubs, which are armed with spines or prickles, but more particularly applied to the Linnaean genus CRTAGUS, now sunk in MESPILUS. (See these articles.) Otherwise this name is almost as vaguely applied as its Greek and Latin synonyms, θρίηνος and πένθος, neither of which is strictly appropriated to any one plant, or family of plants. Accords in Dioclesides, is the name of that well-known herb, whose leaves compose the ornamental part of a Corinthian capital, and which is the Brant-urine, or Acantbus of modern botanists, and as well as of the generality of writers. But he applied the same likewise to a kind of thistle. The Acantbus of Virgil can scarcely be anything else than the Common Holly, Ilex Aquifolium, though we do not find that this idea has occurred to his critics or illustrators. This shrub, so abundant in Italy, cannot be traced, under any other name or allusion, in the poet; while the bright aspect, the farron or scarlet colour, the plant twigs of his Acantbus; but, above all, its being evergreen and bearing berries, Georg. 2. 119, and subjected in winter to the fhears of the gardener, i. e. the Acantbus of Virgil, as circumstances strikingly appropriate to the Holly, not to the Brant-urine, though the name may allude to the prickly foliage of either.

THORN-Apple. See Datura, and Datura Stramonium.

THORN, Black, or Sloe-tree, a species of the prunus, called prunus fayaefris. See PRUNUS and SLOE.

THORN, Box. See Lycium.

THORN, Buck. See Rhamnus, and Rhamnus Catharticus.

THORN, Christ's. See PALIURUS and RHAMNUS.

THORN, Cockspur. See CRTAGUS, MESPILUS, and PYRUS.

THORN, Egyptian, a name sometimes applied to a plant which is armed with strong thorns or prickles, which is said to have been lately found to make a good hedge-plant when kept low by being well cut in. It is also a very ornamental shrubby tree-plant for pleasure-gardens. See ACACIA.

THORN, Evergreen. See MESPILUS and PYRUS.

THORN, Glassabbury, a variety of the Hawthorn. See CRTAGUS and MESPILUS.

THORN, Goat's, a species of Astragalus; which see. See also TRAGACANTHA.

THORN, Haw. The fruit of this thorn has been found useful by farmers in feeding team and other horses. See CRTAGUS and MESPILUS.

THORN, Lily. See CATESBEA.

THORN, Purging. See RHAMNUS.

THORN, Scorpion's, a species of Ules; which see.

THORN, Spanish Hedge-hog, a species of Anthis; which see.

THORN, White, a species of CRTAGUS; which see. See also MESPILUS.

THORN, in Vegetable Physiology. See SPINA and FULCRA.

THORN-Hedges, in Agriculture, a term often applied to such as are made of that plant, whether of the white or black kind. They in most cases form the best fences. See FENCE, QUICKSET, QUICKSET-HEDGE, &c.

THORNBACK, in Ichthyology, the English name of a species of ray-fish, the raiia clavula of Linnaeus, priskly on the back, and with tubercle teeth, and a transverse caristle in the belly: the young fish have very few spines on them, and their backs are often spotted with white, and each spot encircled with black. (See RAIa.) This species frequents
frequents our sandy shores, is very voracious, and feeds on all sorts of flat fish, and is particularly fond of herrings and saus-cells, and sometimes eats crustaceous animals, such as crabs. The thornbacks begin to generate in June, and bring forth their young in July and August, which (as well as those of the skate) before they are old enough to breed, are called maidens. They begin to be in season in November, and continue to later than skate; but the young of both are good at all times of the year. Pennant.

THORNBURGH, in Geography, a town of Virginia; 74 miles S. of Washington.

THORBURY, an ancient market-town in the lower division of the hundred of the same name, in the county of Gloucester, England; is situated 24 miles S.W. from the city of Gloucester, and 182 miles W. by N. from London. The town consists particularly of three streets, in the form of the Roman Y, "having first," says Leland, "one long stretre, and two horns goynce owt of it." The corporation is composed of a mayor, twelve aldermen, and a town-Clark; but the power of these offices is become much limited by difufe. A weekly market is held on Saturdays, but is not much frequented: here are three annual fairs. The church is spacious and handsome: the tower is lofty, and ornamented with rich open-worked battlements, and eight pinnacles. The population, as returned under the act of the year 1811, amounted to 1083; the number of houses to 216. At the north end of the town are the remains of an unfinished castle, which was commenced by Edward Stafford, duke of Buckingham, but stopped when he was beheaded in 1522. This castle may be considered as particularly deserving notice, from its aforning some interesting specimens of the last gradation of castellated architecture. The former splendour of Richmond and Nonfuch, which were contemporary with it, are known only by description and engravings; and Hampton Court, though it rofe under the hands of Wolley at the fame period, is certainly less rich in the minute and capricious ornaments peculiar to the buildings of Henry VII. and his successor. A small part most reembling Thornbury, is seen at Windsor Castle, in an addition made by the first-mentioned sovereign. It is evident, from a survey made in the year 1582, that the whole southern side was habitable, and that it confifted of several chambers, of magnificent dimensions. The tower, the walls of which are perfect, was divided into four rooms, the duke's own apartments; this stands at the south-west angle of the castle. The duke was meditating the completion of the quadrangle which would have included an area of two acres and a half, when his fatal attainer closed his views for ever. Within the circuit walls twelve acres were inclosed: annexed to them are small rooms, intended as barracks for soldiers. In the reign of Elizabeth, the principal timbers were taken away; and time has forwarded the dilapidation. A singular coincidence has been remarked between the front of Thornbury castle and that of Christchurch, Oxford; and it appears as if the rivalry of the duke and cardinal Wolley was exerted even in their architecture. — Beauties of England and Wales, vol. v. Gloucestershire; by J. Britton and E. W. Brayley. Lyfons's "Gloucestershire Antiquities," folio.

THORNE, a market-town in the lower division of the wapentake of Strafford and Tickhill, in the West Riding of the county of York, England; is situated near the south bank of the river Don, at the distance of 10 miles N.E. from Doncaster, 29 miles S. by E. from York, and 167 N. by W. from London. The town appears to be in a progressive state of improvement: it carries on a considerable commerce by the Don; and vefiels trade regularly to London. Ships of a size sufficiently large for the coaling trade, are built at the suburb called Hangman Hill, on the banks of the river, which is also the landing-place for all the merchandise. A canal cut from the Don to the Trent passes within a furlong on the west side of the town. A weekly market is held on Wednesdays; and two fairs annually, each of three days continuance, for horned cattle, woolen cloth, &c. According to the population returns of the year 1811, Thorne contained 637 houses, the number of inhabitants being 2715. The country about Thorne is for the most part fertile; but low, flat, and totally unpicturesque. On the east side of the town is a field of rich sandy loam, and more elevated than the other lands in the vicinity. Beyond this are vast moors, which however are mostly drained and inclosed.

At the distance of about three miles westward from Thorne, and on the Doncaster road, is Hathfield, a large village, famous in the annals of history for the battle fought there A.D. 633, by Edwin, the first Christian king of Northumbria, against Cadwalla, king of Wales, and Penda, the Pagan king of Mercia. This conflict, which was extremely fantastic, terminated fatally for the Northumbrians; their monarch, and his eldest son Offred, were slain, their kingdom subdued, and their country laid waste. This village was the birth-place of William de Hathfield, the second son of king Edward III. The extensive level of Hathfield Chase is laid to contain within its limits 180,000 acres, of which nearly one-half was formerly a great part of the year under water. It was sold by Charles I. to Cornelius Vermuyden, a naturalized Dutchman, without the consent of the commissioners and tenants, to drain and cultivate; which he effected at the expense of about 300,000l., but the affair involved him in ruinous law-suits. In the year 1811, an act was obtained for inclosing between eight and nine thousand acres of rich common in this neighbourhood, which must be ultimately productive of great public and private advantage. — Beauties of England and Wales, vol. vi. Yorkshire; by J. Bigland.

THORNE, a small island of Denmark, in the Little Belt, near the island of Funen. N. lat. 59° 15'. E. long. 9° 53'.

THORNESS BAY, a bay on the N.W. coast of the Isle of Wight, between Newtown and Cowes.

THORNEY, a market-town in the north part of the hundred of Withford, and county of Cambridge, England; is situated in the north-west side of the county bordering on Northamptonshire, 10 miles W. from March, 5 miles S.E. from Crowland, and 84 miles N. from London. It is surrounded by low and fertile grounds, which are now in a very complete state of drainage, the expense of which is defrayed by an annual tax of about a shilling per acre. Its ancient appellation was Ankeridge, which it obtained from the ancients who dwelt in a monastery, or rather an assemblage of hermitages, founded here about the year 662, by Saxulph, the first abbot of Peterborough. The Danes destroyed these hermitages in 870, and the place lay waste till 972, when Etheledwold, bishop ofWinchefter, founded on the site an abbey for Benedictine monks, which became an opulent estabishment, and ranked among the mitred abbeys. In the year 1085, the ancient church was taken down, and a new one commenced by the abbot Guter, but it was not completed till 1128. This structure poffessed considerable magnificence, and was, according to Brown Willis, "at least five times as large as at present." When the abbey was dissolved by Henry VIII. great part of the church was destroyed; but the remainder escaped by being made parochial. The west front, which is the entrance to the church,
church, is the most perfect part of the ancient building. The revenues of the abbey were eliminated, at the dissolution, at 411l. 12s. 11d. clear yearly value. Great part of its poffeifions, with the feite, was granted in 1549 to John, lord Ruffell, ancestor to the duke of Bedford, who is lord of the manor, and owner, not only of the town, but also of 19,000 acres of the surrounding lands. This extensive property is divided into farms from 25l. to 400l. per annum, generally in a very improved state of cultivation. A market is held on Thursdays, and two annual fairs were granted for Thorny to Francis, earl of Bedford, in the 13th year of Charles I. by the charter of incorporation for the government of the Bedford Level. The inhabitants of the parish, who are chiefly the defendants of French Protestants, are rated in the population return of the year 1811, to amount to 1675; the number of houses being 251.—Lyfons's Magna Britannia, vol. ii. part 1. Cambridgeshire. Beauties of England and Wales, vol. ii. Cambridgeshire; by J. Britton and E. W. Brayley.

Thorney Island, a small island, in a bay of the English Channel, near the coast of Suffolk, about four miles in circumference, with a village of the same name, at the mouth of the Lavant; 7 miles S.W. of Chichester.

THORNHILL, Sir James, in Biography, may be called the father of historic painting in England. He was the son of a gentleman of an ancient family in Dorsetshire, and was born at Weymouth in 1676. His family having fallen in fortune, he was obliged to refert to some profefion for support, and guided by an early taste for painting, fixed upon that art as a bafe on which to raife a fortune and a name. He came to London, and was affifted by the celebrated phyfician Sydenham, who placed him under the tuition of an artist of little note, whose name is not known, and to whom, from the flate of the art at the time, he must have been far less indebted for the progrefs he made, than to his owne ingenuity and industry. After having practiced for a while with some celebrity, he travelled to Holland and to Flanders; and thence visited France, but did not proceed to Italy. Most probably his object in this journey was only to acquire a knowledge of colouring; and he might have satisfied his mind on composition and form, by having spent three years in copying the cartoons of Raphael, which he was permitted to do by the favour of the earl of Halifax. These copies are in oil, and were bought after his death by the then duke of Bedford; and by his grace's successor, the late duke, were presented to the Royal Academy. They are wrought with care, but lack the delicacy of character and feeling obfervable in the originals. On his return to England, his reputation was increafed, and honour and employment accompanied it. Queen Anne commifioned him to paint the interior of the cupola of St. Paul's, which he did in eight compartments. The subjeft alligned him was the history of St. Paul; and he treated it with confiderable grandeur of style, both as to composition and execution; but his defign wanted chaffity and fimplicity, and the heads of his figures have not sufficient refinement of expression. It was, however, the firft attempt by an Englishman of the kind, and fully justified the preference given to him by La Guerre and La Foffe, who were then painting the halls and staircases of our nobility. He was afterwards employed to decorat an apartment at Hampton Court, with emblematical allusions to the history of the queen, and her union with her confort, George, prince of Denmark. But his grand work is the great hall at Greenwich Hospital, where he has painted naval trophies and allegorical figures in great profuion; and if much praise cannot be given to the purity of the design, it ought not to be withheld from the brilliancy and vigour of the execution. Altogether, it is a work unrivalled in its kind here, and well entitled him to the honour of knighthood, which George I. soon after conferred upon him. This was some compensation to him for the mortification of having his demand for these paintings contested, and being in the end paid only at the labourer's rate of so much per square yard, (40s.) He had the honour of so far re-establishing his family influence as could be effected by being chosen to represent his native town in parliament; but he did not enjoy his honours long, as he died at the early age of 57, leaving a fon, named Alls James, for whom he had procured the appointment of fermant-painter to the king, and a daughter married to Hogarth.

THORNY TREEFOIL, in Botany. See FAGONIA.

THORNY Reft-Harow, in Agriculture, a frequent weed in poor barren pasture land, which is not removed without difficulty, in consequence of its perennial nature.

THOROE, in Geography, a small island of Denmark, in the Little Belt, near the island of Funen. N. lat. 55° 15'. E. long. 9° 53'.

THOROLD, a township of Upper Canada.

THOROUGH, the common name of an inter-furrow between two ridges. They should always be clean and well-drawn.

THOROUGH-BASE, or accommodation to a continued base by figures.

Thorough-base is but an awkward translation of the Italian terms bafco continuo, by which accommodation by figures, without any other guide for the right-hand on keyed-instruments, was at first called. The French term accompagne was the shortefl and most comprehensive title for the harmony expressed by figures over the base; if, as Rameau has done in his "Code de Musique," we add "for the harpsichord or organ," as there are several other kinds of accommodation besides that on keyed-instruments. Rameau defines accompaniment or thorough-base in the following manner. "Accompaniment on the harpsichord or organ, consists in the execution of a complete and regular harmony, by seeing only the notes of one part of that harmony; and this part is called the base, being in reality the basis or foundation of the whole composition. This base is played with the left-hand, and its harmony with the right."

We shall endeavour to affift our musical reader, who has every thing to learn in the art of accompaniment, more by example than precept, and shall give him a series of progressive lessons in the musical plates, which will explain the whole mystery of musical combinations from the common chord, to the most extraneous harmony.

We take it for granted that he is perfectly acquainted with the musical scale or gamut, in the base and treble clefs at least, as well as with the time-table; and that the accidents of flat, sharp, and natural, are familiar to him. The first thing, therefore, that we shall recommend to his study, is a table of intervals, both in notes and figures. See Plate 11.

1. Presents a scale in half notes, in which all the flats occur, from the unison to the 6th; another scale expressed by sharps.
2. Number of semitones above the base in each interval.
3. Common chords, major and minor, to all the twelve semitones, modulating by 5ths.
4. Modulation in common chords, major and minor alternately, the base falling a 3rd at each change. And in order
order to familiarize the student to these chords in every part of the instrument, he is advised to make three voyages round the harmonic world: beginning with the 8th uppermost, then the 5th, and lastly the 3d, and if no mistake is made, the last chord in each of these circumnavigations will be an octave above the first. But all difficulty in these exercises will be removed, if it be remembered that, in going from chord to chord, only one note is to be changed by the right-hand, which note is always the octave of the new base.

5. Exercise of common chords in accompanying the hexachords in all the keys, major and minor, to their fundamental bases: in the practice of which, dots are placed on the notes in the treble, which are to be played with the little finger. And though only the first hexachord, or fix notes, is written backwards, each of them is intended to be played backwards as well as forwards.

Many years ago, we tried to reduce all the rules of thorough-bass to the compass of a measure-card, and almost all the combinations expressed by figures to common chords. And now, if the preceding exercises of the hand in common chords have done their duty, the student will perceive, from an engraving of the two sides of this thorough-bass card, that what has been explained in words and figures on one side, is illustrated with notes on the other.

The second card goes somewhat deeper into harmonical mysteries, by what the French call la regle de l'obtuse, or rule for accompanying with a specific chord every note of the key, ascending and descending; which, if practiced well in all the 24 keys, and impressed on the memory, will enable the student to figure a base himself, or to play without figures; and by a feeming divination, without a treble part, to know the harmony that belongs to each base of a regular composition, in a diatonic accent and defect.

After these chords are literally at the fingers' ends of the student, the following eight rules and exceptions in playing without figures must be observed.

1. An accidental sharp note in the base is generally accompanied with a 7, and changes the key to the half note above such sharp.

2. An accidental flat note in the base is generally accompanied with a 9, and changes the key to the 4th below such flat.

3. To the 5th of a key, if repeated at a close, two chords are generally played in modern music: the 7 and 9; in old music, the 9, and sometimes the 7th with the common chord.

4. When the base moves per saltum, a 3d, 4th, 5th, or 6th, common chords will do.

5. When the base rises a 4th, and falls a 5th alternately, and the contrary, each note may be accompanied by a 7th.

6. In syncopated or binding notes the 7 are played to the last part of the ligature, by anticipation.

7. Slow notes in the base, in old music, are generally accompanied, as on the plate, by a 9, and 7 alternately.

8. Sustenions of a whole chord, or part of a chord, are expressed by a dash (—) preceding the resolution.

The reverse of the second card contains explanations of these eight rules in notation.

It must be remembered, that whoever is ambitious of playing thorough-bass without figures, must previously perfect the art of accompanying readily with figures. See Composition and Counterpoint, to which thorough-bass is the best introduction: as what is good in playing, would be good, as far as harmony is concerned, in writing. Invention, fancy, and good taste, are necessary to break these chords into melody.

THOROUGH-Wax, in Botany. See Bupleurum.

THORPE ARCH, in Geography. A village of England, in the county of York, where is a medicinal spring, impregnated with sulphur and steel; 3 miles S.E. of Wetherby.

THORPE, Bishop's, a village of England, in the county of York, where the archbishop has a palace, built by archbishop Grey in 1241; 3 miles S. of York.

THORPNESS, a cape on the east coast of England, in the county of Suffolk, forming the southern part of Solebay.

THORSAKER, a town of Sweden, in Geftricia; 21 miles S.W. of Gefle.

THORSBERG, a mountain of Norway, in the province of Aggerhus; 18 miles W. of Tomberg.

THORSHAVEN, a sea-port town of the island of Stromoe, and capital of the Faroer islands, as well as the common market, and residence of the landvogt, and king's counsellor.

THORSTORP, a town of Sweden, in Vefl Gotland; 28 miles S.E. of Gotheborg.

THOS, Thous, &c., in Zoology, a name given to an animal of the wolf-kind, but larger than the common wolf, common in Surinam. It is a species of the canis, with a light bent tail, and white belly. It never touches men or cattle, and rather provides its food by cunning than open force; preying chiefly on poultry and water-fowl.

THOTCHI, or Thatchi Hotun, in Geography, a town of Chinefe Tartary; 368 miles W. Tourfan. N.lat. 42° 32'.

E. long. 83° 8'.

THOTPHA, a town of Hindooflan, in the circuit of Rantapour; 46 miles S.S.W. of Rantapour.

THOU, James Augustus de, (Thuanus, in Biography, an eminent magistrate and historian, was the son of Christophe de Thou, president of the parliament of Paris, distinguished for integrity and patriotism, and born at Paris in the year 1553. In the college of Burgundy, where, he was placed at the age of ten years, his education was interrupted by a fever, which seemed for some time to have proved fatal to him; but upon his recovery he studied the civil law, first at Orleans, and afterwards at Valence, under the celebrated Cujiacus, in which latter place he commenced an intimate acquaintance with Joseph Scaliger, which was continued through life. Upon his return to Paris in 1572, he witnessed the horrors of the massacre of St. Bartholomew, and this scene impressed him with an eternal detestation of bigotry and intolerance. He was originally defined for the church, with the prospect of valuable preferments, which his uncle, the bishop of Chartres, intended to resign to him. In the mean while he travelled to Italy, the Low Countries, and Germany; but upon the death of his brother, his views were changed, and the law became his destined profession. After the death of his father, whose memory he held in high veneration, he was made master of requests in 1584; and in 1587, he married Marie Barbanfon, a lady of a noble family. Upon the revolt of Paris, on occasion of the league, in 1586, he repaired to Henry III. at Chartres, and was deputed by him to confirm the province of Normandy in its allegiance. On the affiliation of the duke of Guise, his family at Paris received public insults, which made it necessary for his wife to make her escape in disguise, and he went to the king at Blois, who was almost delirious, and induced him to form a coalition with Henry, king of Navarre. Being at Venice, he was informed of the affiliation of Henry III., after which he immediately joined the legitimate successor to the crown.
THOU, in Geography, a town of France, in
the department of the Mayne and Loire; 12
miles S. of Angers.

THOUARE, a town of France, in the
department of the Lower Loire; 5 miles N.E.
of Nantes.

THOUARS, a town of France, and principal
place of a district, in the department of
the Two Sevres, near the river Thoue.
The place contains 2035, and the
canton 13,950 inhabitants, on a territory of
5176 square kilometres, in
24 communes; 31 miles W. of Poitiers.
N. lat. 46° 58'.
E. long. 0° 8'.

THOUIE, a river of France, which runs into the
Loire, a little below St. Florent.

THOUGHT, SENTIMENT, a general name for all
the ideas consequent on the operations of the mind, and even
for the operations themselves.

As, in the idea of thought, there is nothing included of
what we include in the idea of an extended fubstancce; and
that whatever belongs to body, may be denied to belong
to thought; we may conclude, that thought is not a mode
of extended fubstancce, it being the nature of a mode not to
be conceived, if the thing, of which it is the mode, be
denied. Hence we infer, that thought, not being a mode
of extended fubstancce, must be the attribute of some other
fubstancce very different.

F. Malebranche, with the spirit of a Cartesien, denies
that a man who thinks seriously on the matter, can doubt
but that the essence of the mind consists altogether in
thought, as that of matter does in extenfion; and that,
according to the various modifications of thought, the mind
sometimes wills, sometimes imagines, &c.; as, according to
the various modifications of extension, matter is sometimes
water, sometimes wood, fire, &c. By the way, by thought
he does not mean the particular modifications of the soul,
but such or such a thought, but thought, or thinking in the
general, considered as capable of all kinds of modifications,
or ideas; as by extension he does not mean such or such an
extension, as a square, oval, or the like, but extension in the
abstract, considered as susceptible of all kinds of modifi-
cations or figures.

He adds, that he takes it to be impossible to conceive a
mind which does not think, though it be easy to conceive
one which does not feel, or imagine, or will; in like manner
as it is impossible to conceive a matter which is not extended, though it be easy to conceive one that is neither earth nor metal, nor square, nor round, but that is even in motion.

Hence it may be concluded, that as it is possible there may be matter which is neither earth nor metal, nor square, nor round, nor even in motion; it is also possible, that a mind may neither perceive heat nor cold, nor joy nor grief, nor imagine any thing, nor will any thing; so that these modifications are not essential to it. Thinking alone, therefore, according to this author, is the essence of the mind, as extension alone is the essence of matter.

But this doctrine is not now generally received. The followers of Mr. Locke deny thought to be the essence of the mind; and the followers of Mr. Onck deny thought to be the essence of the mind.

THOUGHTS, or Thoughts, in a Boat, a name given by seamen to the benches on which the men sit down to row.

THOUINIA, in Botany, a noble genus, though consisting of only one known species, so named by the writer of this, in grateful remembrance of his distinguished friend M. André Thouin, member of the Institute, and at present Professor of Agriculture at Paris. This gentleman is one of the original foreign members of the Linnean Society, and ranks among the best and most philosophical cultivators, as well as botanists, of this or any age. The present plant was collected out of the large and fine collection of new and rare specimens, given by himself to the younger Linnaeus, chiefly from the herbarium of Comeron. We were not aware of its having been named Humbertia by its discoverer, or Endrachium by Lamarck (see the latter article); where we have remarked that the name is barbarous; we should therefore not have adopted it, if known. Humbertia is not accounted for, there being no botanist on record of the name of Humbert, nor has any body explained or defended this appellation. The younger Linnaeus had in fact established a Thouinia, Suppl. 9, after Thunberg; neither of them suspecting their plant to be a real Chionanthus, the exalatana of Limn. Sp. Pl. 11. Swartz, moreover, in his Prod. 14, added a second species to this supposititious genus, which he afterwards disfigured from it, by the name of Linociera, under which head our doubts respecting even that matter are recorded. Considering therefore our original name no more justly superseded than our genus, we cannot allow it to give place to M. Poiteau's Thouinia, Ann. du Musée des. 13, though De Theis has decided otherwise.—Sm. Pl. 7. Schrep. 793. Willd. Sp. Pl. v. 1. 935. Mart. Mill. Dict. v. 4. (Endrachium; Juss. 133. Humbertia; Lamarck Dict. v. 1. 356. Ilustr. 1. 103.)—Clad and order, Pentandria Monogynia. Nat. Ord. Convolvul., Juss.

Gen. Ch. Cal. Perianth inferior, permanent, of five roundish, coriaceous, concave leaves, the three outer ones most thick and rugged, naked; two inner membranous at the margin, filky at the back. Cor. of one petal, twice the length of the calyx, bell-shaped, plaited, externally brilly. Style simple. Berry coriaceous, of two cells. Seeds two in each cell.

Ohf. We see no reason to adopt Jullieu's or Lamarck's idea of this fruit. They call it a coriaceous, or woody, capsula, which does not burst. Commerson, who alone has examined it fresh, denominates it a drupa, which term we would prefer to pulpy fruits with a single nut, and therefore we judge the present to be a bacca, however tough or dry its substructure may appear when dry.

1. T. speciabilis, Beautiful Thouinia. Sm. Pl. Ic. t. 7. Willd. n. 1. (Humbertia madagascariensis; Lamarck n. 1. "H. axifera; Commerr. MSS. et Ic. Endrach-Endrach; Flac. Hift. Madagac. 137. f. 100. Arbre immortel.")—Native of Madagascar; unknown in the gardens of Europe. A tall and large tree, whose wood is yellowish, compact, heavy, as hard as iron, and almost incorruptible even under ground. Lamarck. The branches are round, scarred, filky towards the ends, where they bear tufts of leaves, intermixed with axillary flowers. The leaves are scattered, two or three inches long, obovato-lanceolate, obtuse, entire, smooth and shining, with a strong mid-rib, on channelled filky footstalks, without stipulas. Flowers on solitary, axillary, simple stalks, rather shorter than the leaves, each with a pair of small bractes about the middle. Of the colour of the corolla we have no account; its length is about an inch; and the filky hairs on the outside, in a dry state, are of a shining brown. Fruit the size of a small plum.

THOUN, in Geography, a town of Persia, in the province of Khorasan; 75 miles W. of Herat.

THOURY, a town of France, in the department of the Eure and Loire; 3 miles E. of Janville.

THOUSAND. See Numeration.

THOUSAND Tears' Reign. See Millennium.

THOUSAND Islands, in Geography, a cluster of small islands in the Straits of Sunda. S. lat. 5° 33'. E. long. 106° 33'.—Allo, a number of small islands in the river St. Laurence, a little below lake Ontario; the part of the river being called Thouand Island Lake.

THOUSAND Lakes, a name given to a number of small lakes in America, near the river Mississipi; 60 miles above St. Anthony's Falls.

THOUSAND Rocks, rocks in the river St. Laurence; 72 miles S.W. of Montreal.

THOWLES, in a Boat. See THOLES.

THOYARD, Nicholas, in Biography, a native of Orleans, was born in 1629, and at an early age a proficient in the learned languages, and in medallie science. His own original works were few, but he was liberal in the afflance he afforded to other writers. He published two short Latin dissertations on particular medals, and notes upon "Laecantius de Mortibus Persecutorum," and also a Critique on R. Simon's translation of the New Testament; but his principal performance was "A Concord of the Four Evangelists," in Greek and Latin, which was printing at the time of his death at Paris in 1706, and appeared in 1707, with learned notes, chronological and historical. In this work he maintains that St. Matthew, of all the evangelists, paid the least regard in his narrative to the order of time. This work was printed at considerable expense, and is now rare.

Moreri.

THOY. See THAHT.

THRACE, in Ancient Geography, an extensive country of Europe, situated in the S.E. Its natural boundaries are, on the S. the Aegean sea, the Propontis, and the Bosphorus of Thrace; on the E. the Euxine sea. Its limits to the N. and W. are not so determinately ascertained.

A penin-
A peninsula to the S., between the Melanic gulf and the Hellepont, made part of the continent of Thrace, but it assumed the name of the Chersonesus of Thrace.

The continent may be considered as divided into six parts: viz. 1. The part bounded to the W. by the river Melas, which discharged itself into a gulf of the same name. To the S. it had the Chersonesus and the Propontide, and to the E. the Bosphorus of Thrace and the Euxine sea. The chief towns of this part were, on the borders of the Propontide, Galas, Bithynia or Joseph, Perinthus called also Heraclea, Selymbria, Byantium; and on the Euxine sea, Dercon, Salmydus.

2. The second part of Thrace extended from Melas to the Hebrus. It had several towns on the banks of the Hebrus, of which the principal were Philippopolis and Adrianopolis, called also Orestes, and Trajanopolis. The Hebrus took its rise in mount Haemus, and discharged itself into the Melanic gulf, near the town of Enos.

3. The third part lay between the Hebrus and the lake Bilbionis to the W., colliding, according to some authors, of two subdivisions, viz. from the Hebrus to Littus, and from Littus to the lake Bilbionis. On the sea-coast was situated Maronea, and in the interior of the country Scapathyla, enriched by its mines.

4. The fourth part was narrow, and lay between the lake Bilbionis and the Nileus to the W. The Nileus had its source to the N.W. of mount Rhodope, and near it were the towns of Jamphorinum and of Nicopolis ad Nileum.

5. The fifth part was situated N. of the Tyras, a river which had its source in the mountains S. of Delnetum, and not far from the Euxine sea, and which ran into the Hebrus on the left side of it.

6. The sixth part lay N. of that part of the Hebrus which ran from Beffa towards the S.E. to Oreflis. In this part were the towns of Berea and that of Cabylia, S. of the Haemus.

The Chersonesus of Thrace had for its boundaries to the S.E. the Hellepont and a small portion of the Propontide; to the N. the continent of Thrace; to the N.W. the Cardia or Melanic gulf; this is the peninsula of Romania; and a wall separated it from the continent.

Those who seek the origin of the Thracians in the Old Testament, trace them to Tiras, one of the first descendants of Japhet. But whatever was the origin of these ancient people, it is certain that they were warlike and ferocious, and lived very much like savages. They were divided into different hordes, like the ancient Scythians or modern Tartars. This country, on account of the coldness of its climate, attributed to its mountains, was regarded by the Greeks with a kind of horror.

Thrace, in the Notitia Imperii, is divided into six provinces, viz. Europe, Rhodope, Thrace, Hemonont, the second Macedonia, and Scythia. According to the Notitia of Hierocles, these six provinces contain 53 cities, of which the Thrace of Europe contained 14.

Thrace was anciently governed by kings; of these, the first who gave them laws for regulating and civilizing their manners was Zamolxis, a disciple of Pythagoras. Our limits will not allow us to trace its subfsequent history, as far as it is known. The whole, or various parts of this country were possessed by Philip of Macedon, by the Athenians, by the Lacedemonians, and by Alexander, who made a conquest of the whole country, nor did they recover their liberty till after his death. Lycaenthus, one of the successors of Alexander, was vanquished by a descendant of one of the ancient sovereigns of Thrace. But the tranquillity of the country was of short duration; for a party of Gauls, under Brennus, ravaged Greece, and took possession of Thrace. The Thracians afterwards exterminated the Gauls, and restored the race of their ancient kings. This prince, whose name was Scuthes, and his descendants, reigned without interruption till the time of Vespuian, who reduced Thrace into a Roman province. It afterwards became subject to the Turks, who now possess it. See Rumania.

THRACES, or Thracians, in Antiquity, were an order of gladiators, reputed to be the most fierce and cruel of all. They were so called, either because they were natives of Thrace, or wore armour after the manner of that country. The particular weapon they used was the fist or pugilism, and their defence consisted in a parma, or a little round shield, proper to their country.

THRACIA GEMMA, a stone mentioned by Pliny, and described by him to be of three kinds: the one of a plain green, but a considerably deep and strong colour; the other of a paler green, without variegation; and the third spotted with blood-coloured spots. This is a short description, but the stone seems to have been a Jasper, of the nature of our green Oriental Jasper and heliotrope.

THRACIUS LAPIs, in the Natural History of the Ancients, a stone often mentioned, and first called Bena lapis, from the place where it was first found, which was in the neighbourhood of Bina, or Bena, a town in Thrace. It has been by some authors placed a place in the catalogues of the materia medica; but it is impossible for us to say, with any certainty, which, of several substances now known (which all answer in some degree to the accounts left of it) is the real body they meant by that name.

It was an inflammable body, found in mines, and in the beds of rivers; and, in burning, afforded a very offensive smell.

Some of the late authors have supposed it was our common pit-coal the ancients expressed by this name; others, that it was jet; and others, the common cannel coal. Hill's Theophrastus, p. 34.

THRANITE, in the Roman Trireme-gallic, or those which had three rows of oars; those of the upper row were called by this name, the second the zigita, and the lowest thalamite.

The zigita, or middle row of men, in these vessels, took up but very little room, having a conveniency of moving their hands and oars under the feet of those who sat next before them. See Enneris and Polycrata.

THRASPSTON, in Geography, a small market-town in the hundred of Navisford, and county of Northampton, England; is situated on the southern banks of the river Nen, 22 miles N.E. by E. from the town of Northampton, and 75 miles N.N.W. from London. The town, in general, is well-built; and at the west end is a handsome stone bridge crossing the Nen. By this river a considerable trade is carried on with Lynn, Northampton, and various other towns in its course. The country round Thrapston is open, and affords extensive prospects: from an eminence, half a mile to the south-east, may be seen at one view thirty-six church towers and spires. An annual court-leet and court-baron is held here; at which are appointed the governing officers, a constable, and a third borough; and also broad-weighers, whose office is to see that the bread, butter, and every other marketable commodity, is good and of just weight. A well-supplied market is held on Thursdays; it is the largest mart for logs in the country, that branch alone returns every market-day, on an average, about 500l. Here are also two annual fairs, besides a large market, equal to either of the fairs, which is held yearly at Michaelmas. The population return.
return of the year 1811, states the number of houses in this town to be 13,3, occupied by 762 persons. It appears from Leland, that there was formerly a monastic establishment here. He says, "At the very end of Thracefton bridge stands the ruins of a very large hermitage, and principally well preserved, but a late discovered and repaired."—Beauties of England and Wales, vol. xi. Northamptonshire; by J. Evans and J. Britton.

**THRASEA PETSUS**, in *Biography*, a Roman senator, who deferred to be recorded for his integrity and patriotism, was a native of Padua; educated in Stogai tenets, and a great admirer of Cato of Utica, whose life he composed. As a senator, he was a strenuous adherent of the liberty that remained under imperial despotism, and on this account he exposed himself to the obloquy of all the Jacobins of power. His integrity commanded the acknowledgment of Nero, the execrable tyrant who put him to death, and many instances occur of his undaunted fortitude in maintaining it. We can only felect the following: After Nero had committed the detestable crime of matricide, when the fervile war was decaying, a solemn thanksgiving and annual festivals to commemorate the event, Thrasea, who, we are told, had been accustomed to suffer other adulations to pass in silence, or with a light heart, marked the profusion of these motions by walking out of the senate-house; thus openly exposing his life to a danger which he contemned; for, conformably to the Stoical principles, he was used to say, 'Nero may kill me, but he cannot hurt me.' But though Thrasea often escaped the brutal vengeance of this imperial tyrant, his fate was at length decreed. In the year 66, the 15th of Nero, this monster having imbrued his hands in the blood of many of the most illustrious Romans, now resolved, says Tacitus, to extirpate virtue itself, by the destruction of Thrasea Petus and Barcas Soranus. The amount of the charges against Thrasea alone evinced his contempt of the base adulation of the senate, and his displeasure with the vices and enormities of the reign. No defence could be of any avail, and therefore Thrasea prepared in silence to submit to his fate. When the determination of the senate was announced to him, he was in his garden surrounded by a number of illustrious persons of both sexes, and attentively listening to Demetrius, a Cynic philosopher, who was discoursing on the nature of the soul, and its separation from the body. Having received the decree of the senate, he retired into his bed-chamber, and laid bare the veins of both arms, and then bled to death. Tacit. Annot. Suetonius. Dion Caff. Plin. Epist.

**THRASHING**, &c. in *Agriculture.* See **Threshing**.

**THRASOS**, a term used by Hippocrates, to express a wildness and fiercefns in the eyes of persons who approach to a delirium.

**THRASYBULUS**, in *Biography*, an eminent Athenian, was the son of Lycus, and the restorer of liberty to his country. When the government of 410 succeeded the overthrow of the democracy in the year B.C. 441, he was commander of a galley; and in connection with Thrasybulus, he destroyed the aristocracy in the camp at Samos, and re-established democracy there, and then proposed the recall of Alcibiades, in exile at Magnesia, and restored him to his country. Thrasybulus and Thrasybulus, having purposed the Peloponnesian fleet, brought it to an action in the straits between Selinos and Abyds, in which the Athenians captured 20 ships of the enemy, with the loss of 15 of their own. Another engagement soon after occurred, and the result of the arrival of Alcibiades's squadron was a complete victory on the part of the Athenians. When Alcibiades was made general of the Athenian forces both by sea and land, he nominated Thrasybulus for one of his colleagues; but a misunderstanding afterwards taking place between them, Thrasybulus impeached Alcibiades before an assembly of the Athenians, and procured his disgrace. On the occasion of the establishment of the thirty tyrants at Athens by the influence of the Lacedaemonians, Thrasybulus was one of several other citizens who took refuge in the Thessalian territory; and zealous for the immediate protection of his country, from ferocity, he engaged a small body of fugitives to join him in an expedition to Attica, and took possession of the important fortresses of Phylea, a town on the frontier of Bocotia. Beguiled by the Greeks, Thrasybulus by his activity repelled them, and even followed them to the borders of Athens. Having also hurried a fleet which they occupied near Phylea, the thirty tyrants removed from Athens to Eleusis, and Thrasybulus seized this opportunity of attacking the Piraeus, and his enterprise succeeded. He then issued a proclamation, announcing the Athenians to refit their tyrants, and to restore a free government. Having done this, he established himself in the Piraeus. The constitution of Athens was then changed, by substituting instead of the thirty tyrants, ten magistrates, one from each tribe. The Lacedaemonians still retained their influence over these magistrates, who sent to Sparta soliciting assistance against Thrasybulus. At length, however, this restless commander prevailed so as to open a negotiation between the Athenians and the Spartan government, which terminated in the withdrawing of the Spartan garrison, and the re-establishment of a popular constitution at Athens. This happy close of the contest was followed by the union of citizens of both parties, in a solemn thanksgiving to Minerva at her temple in the citadel, when Thrasybulus exhorted them to future concord. The remaining tyrants at Eleusis endeavoured to foment dissensions in Athens; but the business terminated in an act of amity or oblivion, which was passed by the influence of Thrasybulus in the assembly of the people, and ratified by an oath. This revolution happened in the year B.C. 401. In accomplishing this event, Thrasybulus acted with the most disinterested patriotism; for the thirty tyrants, when he feized the castle of Phylea, had offered to make him one of their number, and to pardon any twelve of the exiles whom he might name; to which offer he replied, that exile was much more honorable than any civil authority purchased on such conditions. Thrasybulus remained for some time in un molested retirement, enjoying the honour accompanying the olive wreath, which, according to the simple manners of the age, was bestowed upon him for his services. But in the year B.C. 390, after the death of Conon, the foreign polleflions and influence of the Athenians were in danger of being lost, and therefore a fleet of forty ships was placed under the command of Thrasybulus, with which he failed to the Hellas. On this occasion he induced two Thracian princes to become allies to Athens, and compelled the Byzantines and the inhabitants of some other cities to abolish their aristocratical governments, and accept of the Athenian model and alliance. He next proceeded against the state of Lebos, in the Lacedaemonian interdict, and reduced the whole island to obedience. Thence he failed for Rhodes having previously raised supplies from the maritime towns of Asia, and the capital of Pamphyia. He also indulged his men in private pillage; and thus so much provoked the inhabitants, that they made an attack in the night on the tents, and put a number of the Athenians to the sword, among whom was Thrasybulus himself. Such was the inglorious termination of a life that had been devoted to the benefit of his native country. Corn. Nepos. Un. Hist. Gen. Biogr.

**THRAVE, or THRAVE, of CORN.**, in most parts of England, is twenty-four shaves, or four sheaves of six sheaves...
to the shock: though, in some counties, they only reckon twelve shocks to the thrave.

King Athlifan, anno 923, gave by charter, to St. John of Beverley, four thraves of corn for every plough-land in the East Riding of Yorkshire.

"Ya fou thre be heaven king,
Of ilka plough of ilf riding."

THRAUPIS, in Ornithology, a name given by many authors to the bird more commonly called Citrinella.

THRAUSMA, a name given by the ancients to a kind of gum ammoniacum, which was drier than the common, and more easily crumbled to pieces.

THRAUSTOMICTHES, in Natural History, the name of a genus of compound earths. The word is derived from the Greek ἄρσμα, brittle, and μίξη, mixt.

The bodies of this genus are loams composed of sand and a lefs vifeid clay, and are therefore of a friable or crumbly texture.

The earths of this genus are generally used to make bricks; and there are several species of them. Hill.

THREAD, in the Linen Manufacture, a small line or twist of flax, the weaving of which composes cloth. There is a stronger kind made ufe of to few the seams of linen garments, or to mend them. The fame term is applicable to cotton or wool. See Spinning.

Thread, says an eminent French writer (Pajot des Charmes), bleached by the oxygenated muriatic acid, may be ufed by the sempitrefhs with much greater speed and brillenfs than thread of the fame quality bleached in the field: it is lefs brittle, and may be fruck much more effectually home to its place in weaving, and does not move afterwards. This information, he says, was received by him from impartial and unprejudiced manufacturers.

The thread of the Laplanders is very fine, white, and strong, but it is of a very different nature from our's; they know nothing of flax or hemp, nor of any other plant whose flalks might supply the place of these in making thread, but their's is made of the finews of the rein-deer.

They kill of these animals a very great number continually, partly for food, partly for the finews, which they ufe in clothing themselves, covering their huts, and on many other occasions; the finews of all they kill are very carefully preferved, and delivered to the women, whose province it is to prepare this neceffary matter. They beat the finews very well, after having fteeped them a long time in water, and then they spin them out.

The thread they thus make is of any degree of finenefs they pleafe; but it is neuer any longer than the finew from which it is made. They ufe this in feving their clothes, shoes, gloves, &c. and the trappings of their rein-deer. The threads of the fame finew are laid up together, and are all of a length; and as the different finews afford them very different lengths, they accordingly pick out such as the present ufe requires, both in regard to length and finenefs. This fort of thread is made with much more labour than our's; but it is greatly superior to it on many occasions, where strength is rather required than beauty.

These people have, besides this, a way of making a fort of yarn of sheep's wool, which they weave into garments and a fort of ribbands, ufed by way of ornament; but they place no value on it, because of its want of strength. Scheffer's Hill, Lapland.

Thread, in Botany, is underfoot of those capillaments usually found in the middle of flowers, as in the lily, tulip, Vol. XXXV.

rofe, &c. There are two kinds: thefe which support apices, are particularly called fiamina; and thofe which have none, pistilla.

Thread, Gold. See Gold.

Thread, Virgin's. See Virgin.

Threads, Air, a term ufed by fome to express thofe fine long white filaments, or thready fubstances, which we meet with in vaft numbers floating about in the air in August and September.

The world has been much perplexed about the generation of thofe, till it was known that they were the work of spiders, and that they served thofe creatures to move from place to place by. They are long, downy, and very soft, and though they hold together when untouched, they flick to the fingers in handling, and easily break with a light touch.

The general method of thofe creatures spinning and weaving the webs, is by letting down the thread, then drawing it after them, and fo disposing it as they think proper; but in the midst of their work of this fort, if they are closely observed, they will be sometimes found to deftill, and turning the tail to the contrary way of the wind, they will emit a thread with great violence, no lefs than that with which a jet of water is difcharged from a cock. In this manner they continue darting forth the thread, which the wind takes, and carrying it forwards, it soon becomes many yards long. Soon after this the creature will throw her felf off from the web, and truffling her felf to the air with this long tail, will afcend with a great height with it. The fragments of thofe lines, or the whole lines, and the spiders attached to them, though not observed, make thofe air-threads, and the ufe nature defines them for, is evidently the waiting of the creature along the air, and giving it an opportunity of preyng on gnats, and many other insects that inhabit the air, out of the reach of thofe creatures by any other means.

When the threads are newly spun, they are always single, and are generally seen ascending higher and higher in the air; but when they are seen coming down, they are found sometimes composed of three or four others, and either without any spider at the ends, or with two or three, or more. It is plain that this happens from the meeting of thofe threads one with another in the air, and their tangling together; and this incumbrates the creatures, and brings them down.

Thofe are what fill the air with the loofe threads we fee in autumn; and as thofe soon entangle together, and bring one another down, it is no wonder that they are more frequent in the lower regions of the air, than thofe with the spiders adhering to them, which uffually rise to great heights, and fillain themfelves there. And hence the origin of the threads was much perplexed among the enquirers, because they were found without any mark of the animal to which they owed their exifence. The bufinefs of feeding is not all the ufe of thofe threads, but the creatures evidently fport and amufe themfelves by means of them, floating about in the air, and changing height and place at pleasur.

When a spider has once raised itfelf from the earth in this manner, it does not defcent always on the fame thread it arose by, but draws that up at times, and winds it up into a bank with its fore-feet, and darts out another by way of support; and the new thread is made more or lefs long, as it is intended for a higher or lower flight. Philof. Tranf. No. 50.

Thread of Glafs may be obtained of indefinite minuteces by means of the blow-pipe. When no thicker than
fine hair, it is extremely flexible and elastic; and if still finer, it may be wound almost like common thread without breaking. The way of doing it is very simple. A piece of glass tube is heated in the lamp, and the end drawn out into a thread by means of another piece of glass cemented to it. When a fine thread is once drawn, the end is carried round a reel or wheel two or three feet in diameter, and by turning the wheel and continuing to heat the tube, an endless thread is drawn out, winding round it as long as the artist pleases or the glass lasts. The quicker the wheel revolves, and the hotter the glass is kept, the firmer the thread, which may thus be made as delicate as a single silk-worm's thread, with extreme flexibility. Different coloured threads are made in this way by using very deeply coloured glasses instead of common glass.

**Threads, in Glass.** See Glass.

**THREAD, in Agriculture,** a term signifying a handful, a bundle, or a pottle, in different districts of the country.

**THREATENING LETTERS,** in Law. By statute 9 Geo. I. c. 22., amended by stat. 27 Geo. II. c. 15. knowingly to send any letter without a name, or with a fictitious name, demanding money, venison, or any other valuable thing, or threatening (without any demand) to kill any of the king's subjects, or to fire their houses, out-houses, barns orricks, is made felony without benefit of clergy. This offence was formerly high treason, by 8 Hen. V. c. 6.

The offence of sending letters, threatening to accuse any person of a crime punishable with death, transportation, pillory, or other infamous punishment, with a view to extort from him any money or other valuable chattels, is punishable by stat. 30 Geo. II. c. 24. at the discretion of the court, with fine, imprisonment, pillory, whipping or transportation for seven years. Blacklt. Com. book iv.

**THREATS,** a species of personal injury. Threats and menaces of bodily hurt, through fear of which a man's business is interrupted, are comprehended under this description. A menace alone, without a consequent inconvenience, does not constitute the injury; but, to complete the wrong, there must be both of them together. The remedy for this is in pecuniary damages, to be recovered by action of trespass, *et armis;* this being an inchoate, though not an absolute violence. Blacklt. Com. book iii.

**THRAVE.** See Thrave.

**Three Chapters.** See Chapter.

**Three Legs, Compasses of.** See Compasses.

**Three, Ombre by.** See Ombre.

**Three, Rute of.** See Rule.

Three-legged Staff, an instrument consisting of three wooden legs, made with joints, so as to flint all together, and to take off in the middle, for the better carriage; and usually having on the top a ball or socket: its use is to support and adjust instruments for surveying, &c.

**Three-pointed Pick, in Agriculture and Rural Economy,** a tool of the pick-kind, having the broad end formed in a three-toothed manner, about six inches in length, of great strength, and having the width, from the out-sides of the teeth or prongs, of about six inches. The other end is formed in the gently curving ordinary one-pointed manner. When complete, it is provided with a handle of the strong wooden kind, inserted into the eye or socket of the head part.

**Three-pronged Fork,** a name sometimes applied to the common fork which is employed for various purposes on farms. See Prong and Spud.

**Three-share Horst-bee,** a light three-shared tool of the horse-hoe kind, for one horse, which is often found very convenient and useful in working the intervals of ridged turnip crops, and those of similar kinds, as well as for different other purposes of tillage husbandry.

It is constructed and wrought somewhat in the form and manner of the common plough, the hoe parts being so contrived and let as to pare and clean the sides and bottom of each of the ridges in the same operation. See Horse-Hoe.

**Three Brethren Hill,** in Geography, a town of Scotland, in the county of Selkirk; 5 miles N.W. of Selkirk.

**Three Brothers,** three islands in the Indian ocean. S. lat. 3° 44'. E. long. 62° 25'.—Alfo, three islands in the East Indian sea. N. lat. 10° 42'. E. long. 108°.—Alfo, three small islands on the coast of Guiana, in the mouth of the Essequibo.—Alfo, three small islands in the Indian sea, near the E. coast of Madagascar. S. lat. 13° 20'. E. long. 51° 10'.—Alfo, three small islands in the East Indian sea. S. lat. 5° 30'. E. long. 132° 15'.—Alfo, three small islands in the Atlantic, near Prince's island. N. lat. 1° 32'. E. long. 9°.—Alfo, three small islands in the East Indian sea, near the W. coast of Amboyna. S. lat. 3° 39'. E. long. 128° 18'.—Alfo, small islands in the East Indian sea, near the S.W. coast of Celebes. S. lat. 5° 25'. E. long. 119° 39'.—Alfo, small islands in the bay of Gunong Tellu, on the coast of Celebes. S. lat. 1° 1'. E. long. 120° 17'.—Alfo, small islands in the Indian sea. S. lat. 6°. E. long. 71° 36'.—Alfo, three hills on the N.E. coast of Terra del Fuego; 9 miles W. of Cape St. Diego.—Alfo, three hills on the E. coast of New Holland, so called by captain Cook. S. lat. 31° 40'.—Alfo, three islands on the Spanish Main, near the Moliquito shore. S. lat. 11°. W. long. 82° 52'.

**Three Greek Run,** a river of Virginia, which runs into the Nottoway, N. lat. 36° 36'. W. long. 77° 12'.

**Three Hill Island,** a small island in the Mergui Archipelago. N. lat. 10° 13'.

**Three Hills Island,** one of the New Hebrides, in the South Pacific ocean, about 12 miles in circumference. S. lat. 17° 7'. E. long. 168° 35'. See Hebrides.

**Three Island Harbour,** a bay on the coast of Patagonia, in the Straits of Magellan; 8 miles N.N.W. of Bachelor's river.

**Three Islands, small islands in the East Indian sea, near the E. coast of Bintang. S. lat. 1° 10'. E. long. 158° 21'.—Alfo, small islands in the Indian sea, near the coast of Africa. S. lat. 4° 50'.

**Three Islands Bay, or Harbour,** a bay on the E. coast of the island of St. Lucia.

**Three Kings,** an island in the South Pacific ocean, near the N. coast of New Zealand, discovered by Tasman. S. lat. 34° 12'. E. long. 172° 12'.

**Three Rivers.** See Tris Rivieres.

**Three Rivers Harbour,** a bay on the E. coast of the island of St. John, in the gulf of St. Lawrence. N. lat. 46° 8'. W. long. 62° 10'.

**Three Sisiers,** three small islands on the W. side of Cheapeake bay.—Alfo, small islands in the East Indian sea. S. lat. 5° 42'. E. long. 105° 41'.

**Three Stone Oak,** a rock near the W. coast of Cornwall. N. lat. 56° 11'. W. long. 5° 32'.

**Three Sugar Leaves,** small islands in the Mergui Archipelago. N. lat. 9° 13'.

**THRELKELDIA,** in Botany, has been so named by Mr. R. Brown, in memory of Dr. Caleb Threlkeld, a Dublin physician, who published a *Synopsi Stirpium Hibercica*.
rum in 1727. This is an alphabetical catalogue, principally founded on the papers of Dr. Thomas Molyneux, on the communications of other people; nor does it, according to our judgment, entitle its editor to any scientific rank.—Brown Prodr. Nov. Holl. v. 1. 409. —Cliff and order, *Viannia Digynia*. Nat. Ord. Holbage, Linn. Arricplic, Juff. Charnodore, De Candolle, Brown.

**ELL. CH. Calyx pitcher-shaped, with an abrupt inner margin.** Petals three, membranous. Stamens opposite to the petals, inserted into the receptacle. Capsule membranous, imbedded in the pulpy permanent calyx. Seed solitary, ovate.

1. *T. diffusa*. Spreading Threlkeldia.—Gathered by Mr. Brown on the south coast of New Holland, and in Van Diemen's island, growing on the beach. This is a small, diffuse, smooth *frub*. Leaves alternate, semicylindrical. *Flowers* axillary, solitary, sessile, without bracteas. Seed furnished with albumen, which is embraced by the circularly inverted embryo. *Brown*. We have presumed to take for petals, though by no means pertinaciously, what Mr. Brown, led by the analogy of the natural order of the plant, considers as mere scales belonging to the calyx.

**THRENGI, or THRENGES, in our Ancient Customs, a denomination given to vassals, but not those of the lowell degree, but such as held lands of the chief lord; other-wile called *drensi, or drenches*.**

"Quia vero non erant adhuc temporis regis Wilhelmi miles in Anglia, fed threnes; praecipt rex, ut de eis miles furent ad defendendam terram: fecit autem Lanfrancus thrensus fuorum miles, &c." Somm. Gavelk.

The name was imposed by the Conqueror: for when one Edward Sharnbourn, of Norfolk, and others, were ejected out of their lands, they complained to the Conqueror, insisting that they were always on his side, and never opposed him; which, upon inquiry, he found to be true; and therefore he commanded that every one should be restored to their lands, and be for ever after called *drenches, or threnes*. Spelm. Du-Cange.

**THRENOYD, THRENODIA, formed of *spiris*, mournful, and *canto, fong*, a mournful or funeral song.**

**THRESHER, in Ichthyology, a name sometimes given to the sea-fox.**

**THRESHER, in Agriculture, a person employed in threshing out grain and other seed crops by means of the flail.** See Threshing, and Threshing-Machine.

**THRESHING, the act of beating out the corn or other produce from grain or other crops.** The flail was the implement formerly used for threshing of corn, and which separated the grain from the straw and husks effectually and expeditiously; but which is now become much too tedious and expensive, as well as liable to many other objections, and always bruises a great many feeds, besides leaving many in the ears. It has been attempted to avoid these inconveniences by proper machines provided with a number of flails, or other parts anfwering the fame purpoze, made to move by the power of water, wind, steam, or horsefr. Of these, various forts have been lately invented, and brought to very great perfection. See Threshing-Machine.

Although there are many different methods made use of in separating the grain from the ear of the corn, that by the flail is the most general and common.

Sometimes two persons thresh together: and where more than two are employed together, which is sometimes the case, there must be frequent interruptions, and a consequent loss of time. It is suggested also, that the tool by which this fort of busines is performed, should be well adapted to the size and strength of the person who uses it, for preventing prejudicial fatigue. The best method of attaching the different parts of the implement together, is probably, it is thought, by means of caps and thongs of good tough leather. Iron is, however, sometimes employed. In the execution of the work, when the corn is bound into sheaves, it is usual for the threshers to begin at the ear-ends, and proceed regularly to the others; then turning the sheaves in a quick manner by means of the flail, to proceed in the same way with the other side, thus finishing the work in a quick easy manner by their becoming loose and open.

It is, however, observed by the author of the "Experienced Farmer," that threshing with the flail is uncertain when most carefully performed, for the thrresher may beat a long time and not meet with every head, which with the machine it is hardly possible to miss; and that the grain wafted by the use of the flail is certainly great. In short, he is of opinion that the corn lost by threshing with the flail, is more than would pay for threshing it by the machine all over the kingdom.

In some places it is the practice to thresh by the measure of grain, as the bushel, quarter, &c. while in others it is done by the threalve of twenty-four sheaves, and in some by the day.

In whatever way the farmer has this fort of busines performe, there is always much necessity for his constant inspection, in order to prevent the frauds and impositions that are too frequently practised upon him by the persons engaged in the execution of it.

The flail practice, however, from its being so extremely slow, tedious, and expensive, and at the same time requiring a great number of labourers, is perhaps only capable of being had recourse to with advantage on the smaller kinds of grain-farms, that are cheaply situated in regard to the command of workmen, and where the expense of having large machines would be much too great for the quantity of grain which they produce. But even in these cafes, if the small horse or hand threshing engines that are constructed on cheap simple principles, and which occupy but little room, should be brought to perform the busines in an easy, expeditious, and effectual manner, which seems not improbable from the improvements that have been recently made in this fort of machinery, it will most probably be to the advantage of such farmers to abandon it, as the saving in various ways must soon repay them the expense of the machine, and at the same time afford them a considerable profit.

It is moreover stated, that where threshing is performed by the flail, expensive barn-floors, either of the fixed or moveable kind, will constantly be necessary; but that the latter fort may sometimes be capable of being converted to other purposes, which may render it useful in other views and intentions, and thereby lessen the heavy charge of providing them. See Threshing-Floor.

It is flated by the author of "Practical Agriculture," that the superiority of the method by machinery over that of the flail is very considerable in many other respects, besides those of its executing the work in a much more clean and perfect manner, more cheaply, and with much greater dispatch, so as to admit of the farmer being present during the process in most cases.

It has been further stated, that the flail is a tool which is only fit for the rude or savage state of a people; while the threshing by the machine can be performed at any season, as when the weather is wet, and when no other fort of work can be done, especially of the out-door kinds; and it will employ women and children, or boys, as well as other
The Threshing.

For labourers. By the use of it, the farmer is enabled to get the advantage of markets, as he has thereby the power of selling and delivering almost any quantity within a little time; and by threshing out and placing the corn in a secure store room or granary, the great loss often occasioned by vermin may be wholly prevented and removed. Numerous other beneficial consequences may likewise result from the practice of threshing by means of machinery, but particularly that of saving the heavy expense of raising and upholding many different large buildings of the barn kind, on extensive farms of the arable description.

It may be stated, that the writer of the Account of the State of Agriculture in the County of Kent, found, on having different parcels of wheat-straw, of thirty-six pounds each, threshed out clean by the flail, by different farmers, and the same weight of straw threshed after it came from the machine, the average produce of corn left in the straw by the common mode of threshing was half a pint in every thirty-six pounds of straw, more than that left in by the machine method. And that, besides, sufficient supplies of both corn and straw may at any time be almost immediately provided, either for the purposes of feed, the market, or the feeding of animals, without the other operations of the farm being in any degree interrupted. It is likewise obtained with much less waste of the grain, and with less danger of its being injured by being bruised. Likewise, that from the then increasing scarcity of labourers, the great advance in the price of labour in all the well-cultivated districts, and the impossibility of having this sort of work performed in a clean and exact manner by the flail, the necessity as well as utility of the machine are established. And it is further contended, that the principal obstacles to machines of this nature being more generally made use of, are those of expense in their construction and erection, and the littering slovenly practice which prevails in some of the more southern districts of harvesting or securing the grain crops in a loose, uneven manner. But the first of these objections may probably, it is supposed, be obviated by the construction and introduction of hand, or one-horse, or ox-threshing machines; and the latter by the daily discoveries that are making in the improvement of this sort of machinery.

It is conceived, that the opposition that has been raised against this practice, on the ground of its being calculated to deprive and prevent the labourers of employment during the winter season, is scarcely deserving of notice, as experience has fully shewn that no injurious consequences can result from it, as there must always be work enough of other kinds at such periods, where farms are under a judicious mode of cultivation.

It is on the whole supposed, however, that the saving of expense in this mode of threshing over that of the flail, must differ much according to the nature and manner of constructing the machinery, the power by which it is wrought, and also on the flate and condition of the grain at the time of performing the operation, as well as the full manner and regularity with which it is supplied and managed. By some farmers it is considered as nearly, if not quite, one half, while others make it much less than that proportion. But with the best constructed machinery, there can be little doubt but that it will be performed on an average of different sorts of grain, and different flates of them, at leas than one-third the expense of the flail method, without taking into the account any thing that the vaff faving in grain, in which some reckon a profit of at least 5 per cent.; others, as equal to the seed and prices of threshing, which is somewhat more than half the price in the flail method; or either of the other operations that may be performed at the same time with the same machinery, such as those of winnowing or cleaning the corn, cutting straw into chaff, bruising and grinding the grain for cattle food, breaking bones for manure, and various other purposes and works.

In addition to the advantages that have been chiefly considered in respect to these machines, there is another which, in the then scarcity of procuring labourers, and indeed at all seasons and times, must be of great importance to the farmer, which is that of their enabling him to perform his work with greater certainty and convenience, and at much less expense of labour. It has indeed been stated by a writer, in a late periodical work on farming, that with a machine, two labourers on a farm will be equal to four without it, as they are left at liberty, during the winter months, for performing various other sorts of farm labour.

It has already been noticed, that the charge of this sort of work with these machines will vary considerably, according to the manner in which they are constructed. In the Agricultural Survey of the County of Kent, the expenses and produce of threshing per day, in different sorts of corn, with an engine of the common construction, without the late improvements, are stated in the manner following:

**Estimate of Threshing Expenses, &c. by the Machine.**

<table>
<thead>
<tr>
<th>For Wheat</th>
<th>£ s. d.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eight men, at 1s. 4d. each</td>
<td>- - - 0 13 4</td>
</tr>
<tr>
<td>Four boys, at 1s. each</td>
<td>- - - 0 4 0</td>
</tr>
<tr>
<td>Four horses, at 2s. 6d. each</td>
<td>- - - 0 10 0</td>
</tr>
<tr>
<td>Cleaning and measuring 24 qrs. at 3d. each</td>
<td>- - - 0 6 0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1 13 4</strong></td>
</tr>
</tbody>
</table>

This is about 1s. 4d. per quarter, or nearly half the price of the flail method.

<table>
<thead>
<tr>
<th>For Barley</th>
<th>£ s. d.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cleaning and measuring 32 qrs. at 3d. each</td>
<td>- - - 0 8 0</td>
</tr>
<tr>
<td>Other expenses, as above</td>
<td>- - - 1 7 4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1 15 4</strong></td>
</tr>
</tbody>
</table>

This is somewhat more than half the price of the flail method, this sort of grain having of late been usually threshed at about 1s. 6d. the quarter.

<table>
<thead>
<tr>
<th>For Oats</th>
<th>£ s. d.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cleaning and measuring 40 qrs. at 1d. each</td>
<td>- - - 0 3 4</td>
</tr>
<tr>
<td>Other expenses, as before</td>
<td>- - - 1 7 4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1 10 8</strong></td>
</tr>
</tbody>
</table>

This is a little more than half the price of that by the flail; this sort of grain being commonly threshed at about 1s. 3d. per quarter.

The expenses are here, however, calculated considerably too low for the succeeding times, as the men would since require 2s. or 2s. 6d. and the horses 5s. or 6s. each at least for the day.

But in the improved machinery of this kind fewer hands are required, and a number of other operations are performed
THRESHING.

formed at the same time, which greatly lessens the expenses of executing the work.

In threshing with a powerful improved machine belonging to Mr. Harbottle, on the Rimmersham farm in Berkshire, according to the writer of the Agricultural Report of that district, the comparative calculations of expense and saving stand as below.

Estimate for Wheat.

A man to feed the machine with sheaves, at} 2s. 6d. per day 0 2 6
A woman to throw up the sheaves into the sheaf-shelf, at per day 0 0 8
A girl or boy to hand and unbind the sheaves to the man who feeds, at the same 0 0 8
A man to riddle or sift the corn from cockles, or small chaff, at 2s. 6d. 0 2 6
A woman to sift him 0 0 8
Two men to remove the straw, and to make it up into bundles, at 2s. 6d. 0 5 0
A boy to drive the horses, and attend to their places, at 1s. 6d. 0 1 6

In all eight persons 0 13 6

Four horses, at 7s. 6d. per day, a liberal allowance 1 10 0

Expence of threshing 20 qrs. which is done in the day of 12 hours 2 3 6

Ditto by the flail, at 3s. 6d. per quarter, supposing a man can thresh a quarter in the day, which is too much 3 10 0

Saving by the machine in 20 qrs. 1 6 6

Or by the quarter 0 1 4

Estimate for Barley.

Two men to feed and loose bands, at 2s. 6d. 0 5 0
Two women to pitch up and supply machine, at 8d. each 0 1 4
Two women to riddle, at 8d. 0 1 4
Two men to remove straw, at 2s. 6d. each, and one boy ditto, at 1s. 6d. 0 6 6
One boy to drive 0 1 6

In all nine persons 0 15 8

Four horses, at 7s. 6d. each 1 10 0

2 5 8

Usual price by the flail, 2s. 2d. per quarter, 30 qrs. the quantity done in the day of 12 hours 3 5 0

Saving on the above quantity 0 19 4

Or by the quarter 0 0 8

Estimate for Oats.

Nine persons employed, as for barley, and the same number of horses 2 5 8

Usual price by the flail 2s. per quarter, on 40 qrs. the quantity done in the day of 12 hours 4 0 0

Saving on the above quantity 1 14 4

Or by the quarter 0 0 10

It should be noticed, that these calculations are made fully to the highest, which is so much the more in favour of the machine.

In some of the northern districts, the execution of this fort of business by the machine is sometimes undertaken by labourers, the farmer finding horses. By this method, in Yorkshire, the work costs for wheat 1s. the quarter, and oats 6d. And in Northumberland they make use of a machine, which threshes at the rate of 33 bushels per hour, or 264 in the day of eight hours. In this machine, the expenses in the attendance of the threshing and dressing parts of it being merely that of three women; one to feed in, another to hand the sheaves to the feeder, and a third to take away and riddle the corn after it is winnowed; consequently the threshing and dressing the above number of bushels only costs 1s. 6d., while the threshing the same quantity by the flail would be 19s. 1d., or 10d. bushels, which at 2s. the bushel is 23s.; to which must be added 2s. for the expense of a man and two women to assist in winnowing, which makes in all 25s.

But in the Agricultural Survey of the County of Norfolk, there is an account of the expense of threshing with the machine in comparison with that of the flail, which furnishes a very different result. The machine was built by a person from Leith in Scotland, for Mr. Bevan, and cost 100l.; and strongly shews, it is thought, that bad machines are worse than the old method of the flail.

Estimates of Wheat.

Forty combs of barley, at 7d. come to 1 3 4
To dressing ditto 0 2 0

Fifty combs of oats, at 6d. 1 5 0
Dressing ditto, at 1s. per score 0 2 0

4 7 6

Forty combs of rye, at 9d. 1 10 0
Dressing ditto, at 1s. per score 0 2 0

1 12 0

Forty combs of wheat, at 1s. 2 0 0
Dressing ditto 0 2 0

2 2 0

Threshing by Means of the Flail.

Forty combs of barley take eight horses, at 2s. 6d. 1 0 0
Ten men, at 1s. 6d. each 0 15 0
To dressing ditto, five men one day 0 7 6

Thus barley costs more by 17s. 2d.

Fifty combs of oats take eight horses, at 2s. 6d. 1 0 0
Ten men, at 1s. 6d. each 0 15 0
To dressing ditto 0 7 6

Thus oats cost more by 15s.

Forty combs of rye take eight horses, at 2s. 6d. 1 0 0
Ten men, at 1s. 6d. each 0 15 0
To five ditto, at 1s. 6d. one day dressing 0 7 6

Thus rye costs more by 10s. 6d.

Forty
Forty coombs of wheat take eight horses, at
£ 1 d.
21. 6d. 1 0 0
Ten men, at 11. 6d. each 0 15 0
Five dito to dreeing 0 7 6

2 2 6

And wheat costs more by 6d.

The calculations of the expenses are here made greatly
under the rate of wages and hire of horses which has since
taken place.

The above should lead the farmer to be careful in put-
ting up these machines; and to be certain of their being
contracted in such a way, as to answered the purpose in a
perfect manner before he begins the work.

It is well observed by Mr. Somerville, in the AGRICUL-
TURAL REPORT of East Lothian, in calling the attention
of the public to the unrewarded merits of Mr. Mickle, in
bringing the threshing machine to a state of perfecti,
that it is computed, by those who have paid every possible
attention to the subject, that in Britain about 7,500,000
acres are annually employed in raising grain, the produce
of which, if averaged at three quarters per acre, amounts to
22,500,000 qr. and, as it is admitted that the surplus
quantity gained by the use of threshing machines is at
least a twentieth part more than when the flail is used,
it will appear that 1,112,500 qr. would be saved annually,
were the whole of the grain in the kingdom threshed in that
way; the value of which, if only calculated at 32s. per quarter,
would be 1,781,250l.; to which adding the savings of ex-
perience, at 1s. per quarter, upon 22,500,000 acres, viz.
4,125,000l., it would make the enormous sum of 2,906,250l.
sterling; a fact almost incredible to any but those who
have turned their attention to the subject, and are well acquainted
with the great difference between the threshing-machine and
the flail.

All sorts of grain should be in a proper, hard, dry con-
dition, when it is to be threshed out, otherwise the work
cannot be performed in a clean and perfect manner, whether
it is to be executed by the flail or the machine.

It is a remark of the time of Little, founded on his own
extensive experience, that wheat threshed in damp weather
generally yields but little flour, with a great deal of bran,
when it is ground; and that if it be put into sacks, it will
grow musty in less than three weeks, let the weather be
ever so dry afterwards: but if, on the contrary, it be
threshed when the air is perfectly clear and dry, it will keep
well in sacks for a long time, especially if these are laid
upon treliffs high enough to secure them from the damp-
ness of the ground or floor.

But for keeping of the meal or flour, in general, there
is no better way than first to bolt and clean it from the
bran or husks, which is apt to make it musty, and then to
tread it down as hard as possible, and head it up closely
in clean, dry, tight, and well-bound sacks, which must be
laid in a cool dry place.

It may be noticed, that the beards of barley come off
best, in threshing, when the sheaves or swarts of this corn
have taken the dew before they are being houfed. It will keep
well in the mow unthreshed for one year; but for making
it into malt, which must be done before the heat of the
summer comes on, it should not be kept above a year and
a half, or at most two years: otherwise it will be filled with
cerevis or insect; unless it has been previously cured in a
flow or kiln.

But oats, from their being defended with a double husk,"n
are the grain least subject to harbour vermin. The best way
to keep them after they are threshed, which should be done
when dry, is to dry them well on a kiln, and then to barrell
them up in clean close casks.

As for beans and peas, they always thresh bell after they
have sweated in the mow, which they are very apt to do;
as the whole crop of either of them never ripens altogether,
the green parts heat, and communicate their ferment to the
whole heap. The danger to be guarded against is, that
they do not heat too much. For this reason, farmers gen-
erally choose to stack them without doors, rather than to
house them; that they may be the more thoroughly dried
by the sun and air. As beans are a very large feed, and
consequently full of moisture, it is found best to let those
that are intended for keeping, sweat and season in the mow
until March, when they may be threshed without danger,
for beans never give again, after they have once been
thoroughly dried and hardened.

And vetches, when wanted for sowing immediately after
they are cut, may be threshed very well on a hurdle, with
a cloth; though they then be too soft, notwithstanding their
being ripe, to be threshed on a floor, where the flail and the
threshers feet would bruise and break them.

In general, in the busines of threshing, as the work pro-
ceeds, it will from time to time be necessary to remove all
the long straw from the corn beaten out of it, which last
always lies underneath, with a prong or fork, and then the
pieces of straw, broken ears, &c. with a wooden rake.
The remaining grain should then be shovelled up on one side
of the floor, and the work be repeated till enough be
threshed out to make what is commonly called a clearing.
The heap should then be wholly passed through a wide sieve,
which retains only the bits of straw, and such fragments
or ends of the ears as have escaped the flail. Thencefrequently
contain some good corn, and form an useful fodder for most
forts of animals, being what are commonly called cavings, as
seen below.

Much labour may often be saved in the use of the sieve
by fastening a loop to its rim, and reeling it thereby on
a hook suspended by a rope. This will fullall half the weight
of the corn, and the necessary circular motion may more
easily be given to it.

After much threshed grain has thus accumulated on the
threshing-floor, and the short straw and chaffy matter have
been separated from it, as just noticed, by passing it through
a wide riddle or sieve for the purpose, which should always
be done before too much grain has been collected, as in that
way the bruising of it is more effectually prevented; it must
be put by to afford more room. The short chaffy sub-
stance thus separated from the grain is in some districts
denominated cavings, or caving-chaff, and is capable of being
employed with advantage, as seen above, in the feeding of
horses, or neat cattle and sheep. When this has been done,
the loose grain should be thrown into a chamber or other
place conveniently formed for receiving it, where it should
remain till a sufficient quantity has been collected to render
the clearing and cleaning of it by some kind of machine
for the purpose, requisite. But the improved threshing
machines render this unnecessary, as they drey or clean it
at the same time it is threshing out. See WINNOWING
Machine.

Furze tops in their young flates of growth are in some
northern situations beat or threshed by the fll, and in that
way bruised as horse-food, where property machinery for this
purpose is not at hand. The work-horses during their use
have little other food, it is said, though performing great
labour.

From the whole of what has been said, it is evident that
the farmer should always consider well before he decides on
the mode of threshing which may be the most proper and
advan-
advantages, as well as the most suitable, to the firm which he holds.

**Threshing-Floor,** the floor on which grain is threshed out in the barn or other place. All floors of this sort should be well formed and constructed, of whatever sort of materials they are made, as without it they give way and fall to pieces. When the materials employed in this intention is wood, the timber should always be of the best kind, and well seasoned, being put together in a careful and firm manner; and when of the earthy kind, the different matters be well reduced, wrought together, and laid up for some length of time before the floor is formed, being then laid down in a smooth even manner, and made firm and solid by frequent ramming with a proper tool for the purpose, until the flooring subsides, whatever it may be, becomes quite dry.

It has been observed, that as grain is threshed out by machinery, from the circumstance of its being separated from the straw immediately, and not permitted to remain upon the floor for an hour or two, when brought to market, is always much drier, looks better, and brings a higher price than that which is threshed by the hand, and suffered to remain upon the floor for weeks, where it becomes mummy, loses its colour, and is so raw, that much of it is bruised and rendered useless in the working. Therefore, if the flat-mode of threshing is still pursued, it is supposed that the inconveniences above-mentioned may, in some degree, be remedied, by paying proper attention to the materials of which the floor is made, and raising it sufficiently above the reach of moisture. Where the barns are very extensive, and the price of wood uncommonly high, as is the case at present, a very good and durable threshing-floor may sometimes be made by laying an uniform stratum of round gravel, covering it with a coat of well-tempered clay; above which, a mixture of clay, brick-dust, forgesmash, and a small proportion of lime, will make it a hard uniform floor, proper and suitable for the purpose of threshing upon. It is observed that the brick-dust and forgesmash should previously be beaten very small, and well incorporated with the clay, using a sufficiency of water to bring the whole to the consistency of mortar; in that state, the lime, having been previously flaked, should be incorporated with the other ingredients; the whole smoothed over with the back of the spade, and allowed to remain in a round heap for two or three weeks, at the end of which time it should be turned over in the same manner as plaster lime, and after being rendered sufficiently soft with water, it may be spread upon the floor, an operation that will require some pains on the part of the workman. The floor, in the first instance, should have the coat of clay, that is laid above the gravel, rendered perfectly smooth and uniform, by rolling, beating, or otherwise; the smoothing coat, composed of the mixture above-mentioned, may then be applied, taking care to break the surface of the clay with shallow lines, in the way practised by plasterers, for the purpose of making one coat adhere to another in a firm and perfect manner.

Many other sorts of materials, somewhat of this nature, are made ude of for threshing-floors in different districts of the kingdom.

The following plan has been suggested as the means of excluding rats and mice from the barn and threshing-floors. First, that when the floor is entirely of wood, the space between the fleecers, upon which the boards are laid, should be entirely filled with washed gravel, well beat down, an operation which, when properly done, will effectually prevent the entrance of either rats or mice; where this precaution is not taken, when the floor is laid, openings should be made at the bottom of the wall large enough to admit cats, a contrivance that will have the two-fold effect of destroying the vermin, and affording a free circulation of air. Secondly, that when the floor is of clay, the vermin generally burrow under the foundation, and have the entry to their retreats at the bottom of the wall; in such cases, their access into the barn will be, in some measure, if not entirely, prevented, by mixing a considerable quantity of broken glass with the materials with which the threshing-floor is made. It does not appear necessary to mix the glass with the clay over the whole floor; perhaps two feet from the wall quite round will be sufficient. And thirdly, that the top of the wall, as furnishing a temporary retreat for vermin, deserves also to be noticed: in every instance it is customary for the mason to level the top of the wall previous to the roof being put on, which, when the building is finished, is left in that state, by which a considerable space remains for the shelter of rats and other vermin: to prevent this, as soon as the roof is finished, the building of the wall on the inside should be continued upwards till it joins the roof, to which it should be closely united by hard platttering. It is supposed, by these precautions, and smooth platttering, the walls of barns as well as the threshing-floors may be preserved free from vermin.

**Threshing-Machine,** an engine of the mill kind, contrived for the purpose of threshing grain, seeds, and pulse out of the straw or the ear.

This is a sort of mill or machine that has been chiefly contrived on the same principles as those of the flax-mill, and which is capable of being wrought by different powers, as those of horses, oxen, wind, water, and steam; but those of water and animals are the most proper and convenient in most instances: in some cases, the grain being beaten or swingleed out of the ears by means of beaters attached to a cylinder that has much velocity, while in others it is rubbed out by suitable means against confined cylinders, as will be more fully seen and explained in what is laid below.

There is some reason to suppose, that the original hint or notion of these mills or machines, was derived a long time ago from Holland or the Low Countries, and thence brought into the northern parts of this country, where the different parts of the machinery of them have been gradually undergoing much modification and improvement, to render them more suitable and efficient for the purpose; so that they have now attained a considerable state of perfection in most parts of the kingdom. The first of these improved machines was, as Mr. Somerville says, invented by a Mr. Menzies, brother to the then sheriff depute of the county: the machinery was driven by a water-wheel, which put in motion a number of rails of the same kind with those used in threshing by the hand. Trials made with these machines were so far satisfactory, that a great deal of work was done in a given time, but owing to the velocity required to do the work perfectly, they soon broke, and the invention fell into disuse.

Some time in the year 1758, another attempt was made by a farmer in the parish of Dumbie, in Perthshire. His machine was constructed upon principles similar to the flax-mill, having an upright shaft with four arms inclosed in a cylinder, three feet and a half in height and eight in diameter, within which the shaft and its arms were turned with considerable velocity by a water-wheel. The sheaves, being presented by the hand, were let down from the top upon the ears, by which the grain was beat out, and together with the straw deflected through an opening in the floor, where they were separated by riddles and fansers, also turned by the wheel.

And
And it is added, that, about twenty years after this, a third attempt was made by a Mr. Elderton, near Alnwick, and a Mr. Smart, at Wark, both nearly about the same time. Their machines were so constructed as to act by rubbing, in place of beating out the grain. The sheaves were carried between an indented drum, about six feet in diameter, and a number of rollers of the same description ranged round the drum, towards which they were pressed by springs, in such a way as to rub out the grain when the drum was turned round. Upon trial, this method of construction in these machines was also found defective, as along with its doing very little work in a given time, it bruised the grain, and so materially hurt its appearance, as to lessen its value considerably in the markets.

It is further stated that the machine, in its then imperfect state, was seen by the late Sir Francis Kinloch, bart. of Glenmerton, a gentleman well acquainted with mechanics, and who had paid much attention to country affairs: it occurred to him, that the machine might be rendered more perfect, by inclining the drum in a fluted cover, and fixing on the outside of it four fluted pieces of wood, capable of being raised a little from the circumference by springs, in such a way as to press against the fluted cover, and to rub out the grain as the sheaves passed between them; but after repeated trials, it was likewise found to bruise the grain nearly as much as the model from which it was copied. In that state it remained some time, and was afterwards sent by Sir Francis to a very worthy and ingenious character, Mr. Mickle of Know-Mill, in his neighbourhood, (a millwright by profession,) who had for a considerable time employed his thoughts upon the same subject. After much consideration, and several trials, it appeared to Mr. Mickle, that the purpose of separating the grain from the straw might be accomplished upon a principle different from any that had hitherto been attempted, namely, by sketching acting upon the sheaves by their velocity, and beating out the grain, in place of pressing or rubbing it out. Accordingly a model was constructed at Know-Mill, in which the grain was beat out by the drum, to which it was presented through two plain feeding rollers, which were afterwards altered for fluted ones. The first machine, on a large scale, executed upon this principle, was, it is said, done by a son of Mr. Mickle's, for a Mr. Stein of Kilbagie, in the year 1786, which, when finished, performed the work to the satisfaction of all parties. A patent was afterwards applied for and obtained in 1788. Since that period, as well as the first introduction of these machines, many other improvements have been made upon them by different ingenious artificers in many different places; a screen has been added for the grain to pass through into a winnowing machine, and a circular rake to remove the straw from it; as before this addition, the straw was forced out from the heater upon the upper barn-floor, and required much time and labour in shaking and putting it into order, which by this contrivance is saved. And besides having a sufficient degree of velocity, without its being so great as to injure the machinery, it is found that a point upon which the clear threshing of all sorts of grain materially depends in the use of this machine, is the management of the iron covering, under which the beating-wheel, having six or more beaters, moves: in some machines this is fixed, while the beating-wheel is capable of being raised or depressed at pleasure; but a more late improvement is to render the iron roof moveable and the wheel fixed, the iron being placed so close to the beaters, that the grain is rubbed as well as shaken out of the ear. And in some cases the beaters are somewhat rounded, but the flat form is probably better.

Different machines of this sort are also said to have been lately constructed so as to work with chains instead of cogs, and to perform the business in a satisfactory manner. Another great improvement is likewise believed to have been made on the feeding rollers; which is that of having the upper roller, instead of being one solid cylinder of wood, with rods of iron fixed upon it, as was formerly the case, an octagon or decagon of cast iron, and divided into four parts, which are loosely joined into each other, so that in turning round, each part can rise or fall in a separate manner, according as the corn is spread out in a thicker or thinner way. The advantage is, that by means of this contrivance the corn is regularly held; whereas, by the roller being all of one piece, if at one part the grain should happen to be more in a heap or lump than at another, the whole roller is raised, and a great part of the grain passes through, without having been held sufficiently to the beaters, and is consequently imperfectly threshed out.

This sort of machine is sometimes constructed with a vertical shaft, on which is fixed in a horizontal manner an iron bevel wheel, six feet in diameter, which drives another about eighteen inches diameter upon a tumbling shaft, upon which is also an iron fpur-wheel, three feet six inches in diameter, driving one about ten inches upon a short iron shaft, which likewise carries a drum or pulley, three feet six inches in diameter, from which a fix-inch strap drives one nine or ten inches in diameter, hung upon the iron shaft or spindle which runs quite through the wood-beater or barrel, two feet in diameter, and three feet in length, having fixed upon it, by means of strong screws into its iron bands, twelve wrought-iron bars, about an inch square, which beater making upon its horizontal axis about three hundred revolutions in a minute, and consequently nearly three thousand fix hundred strokes in that space of time; the corn being carried to it by means of a cloth, which is moved forwards by rollers, lying nearly upon a flat surface of six feet long, by three feet wide, two to three feet high from the ground-floor, which is a very convenient position to feed upon, and paling between a pair of fluted rollers, over a bar, comes in contact with the beater, through a cavity, which may be varied by screws, from an inch in width, to the thickness of a grain of corn, when the straw is immediately delivered, perfectly clean upon the floor on the outside of the machine, no more injured for thatch, or other purposes, than by the flail, and the corn in its passage under the beater is filtered through a wooden frame to the floor, where it remains for removal. Upon this kind of threshing-machine many different trials have been made in the view of ascertaining what sort of power, construction, and velocity or speed, would produce the best and most beneficial effects on the work, and many improvements have been suggested which we have not room for reciting.

Some machines of this sort have large wooden fly-wheels, of from twelve to fifteen feet diameter, fixed upon the tumbling-shafts, which run over or above the horse's heads, perhaps made of fir-timber, as cork unfortunately is seldom to be met with; but as their speed, in such a situation, can rarely afford any assistance, the lighter they are, the less impediment, it is supposed, they will produce. The bars or beaters are also sometimes as much as an inch and a half, or two inches thick, from the barrel or roller upon which they are fixed, and the roller itself three feet or more in diameter; but so much of the bar is certainly, it is thought, unnecessary, as exceeds the length of straw drawn in by the rollers, during each interval between the strokes, and which is seldom more than half an inch; consequently, whatever is more than three quarters, produces an increased impediment.
The greater the diameter of the same beater, from meeting with the principal resistance, so much farther from the centre, of course, the proportionately greater power is required to work it; but this last description of beater is said, in general, to be found to make the best work, and the reason is thought obvious: they are necessarily driven by water, stream, or a number of horses, and, it is concluded, calculated to make the same number of revolutions in a minute as one of two feet, in which case their velocity, on which all depends, is, jult half as much more—a most important point indeed. The means of regular steady driving is likewise of material importance in all machines of this nature, where animal labour is necessary.

A very powerful improved machine belonging to Mr. Harbottle, of the Rimingham farm, near Henley on Thames, consists of a horse-wheel which contains 136 teeth, or pinion wheel with 26, a large wheel with 88, another with 21, the same with 88, and a further one with 21, forming the drum. Underneath the drum is the contrivance for winnowing, or the wheel that separates the chaff from the corn, by blowing it back into a bin below the feeder, and allowing the corn to fall into a box, from whence it runs. Every revolution of the horse-wheel in this machine produces eighty-eight and a half of the drum; and as the horse-wheel goes about three rounds of twenty-four yards each per minute, or two miles and a half in an hour, the drum of consequence must revolve on its circumference, of three yards and a half, 265 times in a minute, or 0.27 yards. The feeding-board is five feet four inches wide. The drum-wheel is four feet four inches diameter, being covered with sheet-iron, and has four beaters, which project four inches making the number of revolutions to one of the horse-wheel, and the horses going the above distance in the hour; in a path twenty-four feet diameter. The cogs of the wheels are of white horn properly feathered, working into others of cast-iron; paid only with black lead, not any grease being employed. The level of the flage on which the men stand to feed, is eight feet above the barn-floor in which the machine is fixed.

The drums of threshing-machines, it is remarked, in general revolve from sixty to a hundred times for one revolution of the horse-wheels; and that in proportion as the move flower, the horses must go faster, so that the utmost nicety is necessary to properly adjust this: as if the horses are under the necessity of trottling, they are greatly injured in long continued exertion, and if they move too slowly, the work is imperfectly performed. A steady common walk is the pace at which horses should be kept, and the drums of machines should be formed accordingly, in order fully to effect their work, and at the same time to enable the horses to do a good day's labour without too much fatigue and inconvenience.

This machine will thresh, it is said, from twenty to thirty quarters of wheat in twelve hours in great perfection; from thirty to forty-five of barley in the same time; and from forty to fifty quarters of oats. It threshes every thing perfectly clean when the grain is in sheaves. But though it cleans the corn from chaff, as seen above, winnowing is required afterwards. It was seen with one feeder to thresh twenty-two large and long sheaves in three minutes, without any variation in the ordinary movement of the horses. This machine was constructed by Elliot of Hexham, in Northumberland, and cost about 200l., without the expenses of fitting up, &c.

It is stated, in the Essex Agricultural Report, that Mr. Newman of Hornchurch has a threshing-mill which was built by two young millwrights from Somersetshire, in which there are two new circumstances of improvement, one of which is a movement so prepared, as that the person who feeds the mill, by putting his foot on a pedal can lift one of the fluted cylinders out of its work, so that the wheat-ears having been advanced far enough to be threshed, the flay may be drawn back again and be prevented from being broken; the other is a click, or iron, which admits the horses to be stopped suddenly without stopping the beater; by which the connection is removed for a moment, so that one operates without the other: this is of capital importance in working the machine. Representations of these improvements are given in the above work.

These machines have occasionally grinding-mills combined with them, and are in this way found very convenient and advantageous. The Hon. Newton Fellows, in Devonshire, has been at very great expense, in erecting a threshing-mill connected with one for grinding, both of which are wrought by a never-failing stream of water. The power of this mill or machine is said to be calculated as equal to sixteen horses. And together with its power and capability for threshing, winnowing, and driving every kind of corn, the pair of flanes for grinding attached to it are about four feet in diameter, to which a bolting-machine or apparatus is added.

In working, this threshing-machine is capable of discharging about twenty-five bushels of wheat, and nearly forty bushels of barley or oats in the hour. The barn, or place where the machine is placed, being filled with the wheat or other corn; the manual assistance for performing the duties is distributed through it in this manner: one man and two women for unbinding the theaves of corn and feeding the rollers, which lift are grooved and divided into lengths of six to eight inches: on the flay being discharged from the machine, one person attends to make it well over a large open screen, whence it is tossed over to another person, who removes it out of the way. At and under each of the winnowing-machines, sieves are placed to receive the grain coming directly from the machine, which is then put into the hopper of the fan of the second winnowing-machine, from which it is again received into another sieve and thence discharged into the hopper for grinding, for the market, or for other purposes: in passing through this little fan, such a separation takes place of the chaff, to completely to divide the head from the tail corn. A cylindrical pearl-barley machine or apparatus is also applied and used to cleanse the wheat of the chaff, and thus by taking off the down end of the grain, a much finer sample of both wheat and flour is obtained. This is preferred to the brush apparatus; for although that may cleanse the body of the grain, it will not carry off the dust from its end, which may reasonably be supposed to contain the germ of the grain, or to form the neli of other animalcula, equally injurious to such grain when used as feed on lands.

There is in this machine only one labouring man employed to five women, which is an advantage of great importance in many situations. The introduction of such machinery as this is therefore of great benefit in bettering and improving the rural condition of the country.

But, besides machines of this sort being constructed for performing the different operations of threshing, winnowing, grinding, and bolting, they have sometimes contrivances for other purposes, as an iron hopper axis for grinding apples; and a contrivance for sheellng clover feed, and the haddocks of wheat. These two additions belong to a threshing-machine of Mr. Vinns in the above district; and some others are occasionally met with in other places which are a little different in their nature, but unnecessary to be here described.

In the general construction of these machines, they are commonly,
Mr. Whiting, of Fring, has also a large threshing-mill, built by Mr. Fordyce, an engineer from Scotland. It is called the 200. It is worked by six horses; threshes twenty-four coombs of wheat in the day, fifty-five of barley, and from sixty-three to eighty-four of oats. It has five beaters on the drum-wheel, and the fluted segment of a cylinder which covers the drum in two parts, with an unfluted plate between them, which is raised or sunk by a short lever: this is a guard against hones getting in. In another circumstance also it is angular; there is a long platform, with a rolling cloth bottom: the whole raised or sunk for delivering the corn, across the floor space of the barn, from the gulf in which the corn is flaked, to the other end in which the mill is built; which saves much labour, and works to his satisfaction.

The horse-wheel is here upon a different construction from the common ones, working by a caged-wheel of small diameter below, instead of above the horses; and the communicating spindle under their path; but it is said to be hard work.

And Mr. Coke, of Holkham, is fitted to have a very large machine, which coil about 600. Besides threshing, it grinds corn, works two chaff-cutters, and breaks oil-cake. It threshes sixty-four coombs a day.

Mr. Reeves, of Heverland, has a threshing-mill which is, the writer thinks, still nearer to perfection than any other he has seen; it was made by Aheby, works with two or three horses, and cost a hundred guineas. He found it at work, threshing oats; it does for barley as well as for any other grain, threshing thirty-two coombs in a day of seven hours and a half; more of oats; forty of peas; and thirty of wheat: its day's work of wheat, threshed the day before he saw it, was thirty-one coombs, which were flanding backed in the barn. It varies considerably in the beating-drum cylinder from the others he has seen, it being of a much larger diameter, and has eleven beaters.

At Brightwell-Grove, in Oxfordshire, according to the Agricultural Report of that district, there is a threshing-machine, belonging to Mr. Lownde, which was constructed by Railrick, and in which there is some novelty of convenience: it works by means of four horses; the drum-wheel, in this case, is three feet and a half in diameter, makes two hundred and fifty revolutions in a minute, and, having sixteen beaters, it gives 4160 strokes in that time: there is a rake with four fags of teeth which takes the straw, and delivers it to a second drum-beating cylinder two feet in diameter. This drum is termed the drawer, and turning in an opposite direction to the motion of the straw, beats it down, and in its descent strikes it against a circular board, faced with bars sod with iron, through the space of eighteen inches, by which the straw receives several additional strokes, which, it is conceived, have a great effect in dislodging that corn which has not been completely separated in passing the principal drum. This is the addition not usual in these machines. There are wrought four hours at a time, in which eight quarters of wheat are threshed out. Every thing is threshed perfectly clean; and the straw is not broken more than by the flail. Twelve quarters of barley are threshed in four hours, and sixteen have been done in that length of time. The horses, in this machine, are not attached in the draught, in the manner which resembles pushing, by advancing with the lever before them, but in the common drawing method, with the lever behind them, in which way they are suppos'd by some to do the work much better.

This machine was seen to thresh forty-three flake in ten minutes. It drels at the same time; and there is a chaff-cutter,
eutter, as well as a corn grinding-mill with stones, for farm use, attached, and wrought or not, at pleasure.

It is perhaps only in places situated in the immediate vicinity of a colliery, and where, from the cheapness of fuel, they are capable of being worked at a very trifling expense, that steam can be had recourse to as the moving power of these machines. See Steam, and Steam-Engine.

With regard to small machines, it is said in the East Lothian Agricultural Report, that they have been introduced there, upon a reduced scale, at a price so low as 40l: that these small machines, having little work to do, and that little being, in general, done slowly, answer the purpose tolerably well; but though cheaper in the first instance, they are, in the end, more expensive than larger ones, a certain degree of strength being absolutely requisite to do the work perfectly. If the parts of the machine are below that degree of strength, the work is either ill done, or the machine is destroyed, by being exerted above what it is able to bear.

The writer of the Essex Agricultural Survey too flates, that in that district at present many are made by Balls of Norfolk, the price fifty guineas, and do their work very clean and well for all sorts of corn, but do not drefs. They have been applied to white clover, and have done it to the satisfaction of the growers, by palling it through twice or thrice. In one erected by Mr. Vaisey, which is worked by horses, one man feeds, two supply, a boy drives, and two men clear away the straw. He has threshed sixty quarters of wheat with it in eighteen hours. It cost 52l. 10s., and 10l. putting up; the shed added about 20l., two winnowing machines 15l. 15s., in all, complete, about 100l. But in this a greater number of horses are used than are noticed above. The owner has no fault to find with its performance, but is very well satisfied with it. He has applied it to cobbing white clover with great success; by palling it thrice through the mill, he got from three jars, seven barrels of clean feed in four hours. And one built by Dickson of Ipswich, for Mr. Sanxter, goes with two or four horses, and costs fifty guineas. It is supposéd that it will thresh twenty quarters of wheat per diem. But it is now fifty-five guineas, put up and ready to work. Two horses work it, without hard labour. The last year's wheat, which was very badly threshed at 7l. per quarter, was done by this machine perfectly well. Also at Little Walkering, Dr. Apilin has a machine which the writer saw. Working with one horse, which moved with great ease, driven by a little girl; one man and two boys work it, and it does three quarters of wheat in a day. The writer examined the straw for about a quarter of an hour, and did not find a single kernel in it. The price is sixty guineas. The construction in this machine varies from the others he has seen, in the wheels which communicate the motion. The doctor threshes only wheat with it, though it will do for all sorts of grain. He thinks it answers greatly, and is perfectly satisfied with it. It was made by Turbot, Bankside, Wellminster, but they are now made by Jones, Clement's Lane, Clare-market, London.

There are many other persons who put up these machines at an equally reasonable rate, and so as to work with much perfection.

Where machines of this sort cost about one hundred guineas, the annual expense in interest of capital and repairs cannot be more than from 10l. to 12l. at most, except in the expenses of teams and the labour of the persons employed in the execution of the business and work about them.

The expensive machines which have rollers for rubbing out the grain instead of beaters, are thought in general to perform the business in the most perfect manner, though they require more power to work them.

It is, however, thought by some to be utterly impossible to build threshing-machines which will do justice to the owners for any such sum as 50l., or thereabouts, as their durability and success depend materially on their firmness, strength, solidity, and other circumstances of the same nature, which are by no means attainable for any such money. Yet many of these small machines of one or two horse power, are said to perform their work well, and at the rate of six quarters of wheat, and the relative proportions of other sorts of grain, in the course of the day. They are flated to be made in several different districts, at the prices of from thirty to fifty guineas, so as to thresh well at nearly the above rate, and to have, in some instances, other additions, such as chalk-cutters, &c. made to them. In particular cases, they are thought not to break the wheat-fraw so much as the flail; and though wheat and beans are mostly well threshed by them, barley is under the necessity of being often twice paffed through such machines, as seen above. They do not drefs in general; but sometimes head clover in a pretty perfect manner, as noticed already.

Small threshing-machines have likewise been constructed so as to be wrought by hand, in some districts, both in the northern and southern parts of the kingdom, and been offered by some to perform their work in a clean and satisfactory manner; but from their mortlly wanting that degree of velocity, in being wrought in this manner, which is essential to good work of this kind, they have not yet become in any way general. Indeed, in some districts in the south, the working of them by the hand not being found to succeed well in actual practice, the usual feeding rollers have been applied with the horse-tackle, at the additional charge of about 20l., which has enabled them, it is said, to do the work properly, and in an easy manner, even by the power of one horse. Where the teeth of the iron wheels in such machines have been found too fine for the increased force made use of in this way, vertical wooden wheels and pinions have been put in their place, which have contributed to the strength and preferred the simplicity of the machinery.

Threshing-machines have now been known, and in some measure employed, in the northern parts of this country for more than half a century, and are at present very general in those that are any way improved; but in the more southern districts, they have only been attended to, in any considerable degree, for the space of the last thirty or forty years, yet their use and application are fast becoming general among the more extensive farmers whose farms are of the arable kind. In short, it is not improbable but that in a little time the machine will be the most prevalent method of threshing out corn. And it has been conjectured, that parish machines of this nature, in centrical situations, would perhaps not be less useful or convenient than parish mills, while, at the same time, they might be easily so regulated as to be rendered of great general benefit to the community, as well as advantageous in the way of private speculation to individuals. Something of this sort is said to be already in the case in some districts of the North, and would, I believe, be defirable in all, for the convenience and accommodation of the small farmer; as the same conveyance that brought the corn to be threshed, might take back the straw and grain, and in this way little waste of labour or time be fuitual, while the saving would be considerable and certain.

It may be noticed also, that in all cases where threshing-machines are made use of, they should be well suited to the extent
extent of the farms, and he erected in such a manner as to be convenient for having the contents of the flacks brought to them. In this view it has been suggested, in the Report on Agriculture for the West Riding of Yorkshire, that the barns to which they are attached should extend into the yards in which the flacks are contained; as in that way the labour and time will be considerably lessened of supplying them with corn in the flack for being threshed. And it has been justly remarked, by an intelligent promoter of agricultural improvements, that this machine has not been attended with one-half of the advantage which might have flowed from so useful a discovery, for want of combining the use of it with the various connected circumstances of the farm-yard. The buiness of flaking corn, for instance, mulf, it is conceived, receive an entirely new arrangement in consequence of building a threshing-mill or machine. By means of no other additional expense than that of an iron railway, and placing the flacks on frames resting on block-wheels, two feet in diameter, a very considerable annual expenditure in time and labour mulf, it is supposed, be saved in carting flacks to the barns, in lots of corn, and in waiting for good weather, as well as in the saving of threshing by flails, and all the attendant evils of pilfering and leaving corn in the flack. This is a material object, which it is thought cannot receive too much attention from both landlord and tenant. It is contended that there cannot be the smallest doubt of the propriety or profit of having one of these machines fixed in the principal farm-yard. But that where the farm is large, and flacks consequently scattered over various fields or parts of it, then it may be right to have a moveable one also; but so many operations are wanting at home, that one should certainly be fixed. The circular form of the railway upon which the flacks are brought to the mill or machine, is considered necessary in such cases, as being the only one which permits a choice of any particular flack to the thresh, without waiting for all or many others being done before it can be got at; but a straight line leading to and past the mill or machine is admissible, except for this circumstance, though much inferior, in some other points, to the circular form. In forming this plan, a fort of railway should be so contrived as that a horse or two may be sufficient to draw all common flacks to the mill or machine. And it is directed that the wooden stumps on which the frame rests should be tinned, or laid in the common manner with brafs latten, which is more durable than common tin, to keep out rats. Also, that as the power applied to the threshing-mill in other ways is at hand, and applicable also to the above fort of work of drawing the flacks, it may be used for the purpose in many cafes.

Threshing-Mill Barn or Building, that fort of barn, fixed, or other building which is calculated for receiving, or which contains this kind of mill or machine.

In this intention, an upper floor, raised eight, nine, or ten feet from the ground, in proportion to the height or size of the animals, and the arrangement of the machinery which is to be employed, will be required, and which should reach from end to end of the barn or building, as a repository for the unthreshed corn, which should be there lodged and deposited, at leisure times, from the flack-yard, or other places, in order to be ready to feed the mill or machine with from this upper floor. The ground-floor should contain the large mill-wheel, and a horse-path round it, all the lower parts of the machinery, a dressing-room for the grain, and a wide open space for flack of different sorts, which is there to be piled up, ready for the cattle-sheds, on each side of this repository of fodder.

The expenses of these prepared barns or buildings, will probably not only be much lighten, but wholly done away, in some cafes, by the use of the threshing flack farm-yard, which has been described in speaking of the mills or machines for this use, and much convenience and accommodation be thereby gained to the farmer in the dispatch of the business, &c.

On the whole, by these means the labouring teams and hands will be enabled to perform the work of threshing at such wet, houmy, and leisure periods as will render it the least troublesome and expensive to the farmer. See Threshing-Machine.

Threshold Point, in Geography, a cape on the north-west coast of New Guinea. S. lat. 6° 37'. E. long. 132°.

Threx, among the Romans. See Thraces.

Thrip, in Botany. See Statice.

Thrihing. See Thrihing.

Thrimsa, in Antiquity, a silver coin, the value of which has occasioned a variety of conjectures. Lamhard, who gave the first effum of it, makes it a three-shilling piece, in which opinion he is followed by Sir Henry Spelman. Bifhop Nicholfon apprehends, that it was the name of their common coin, and that the thrimbus, fceata, and penny, were all of them the fame. Somner, from the import of the word, and the value given to the thrimbus in the Saxon laws, rates it at three-pence. Selden, Brady, and Hickes, are of opinion, that this coin was either the half tremis of the Franks and Germans, and conquenently four-pence, or the third part of the Saxon shilling, i.e. three halfpence and one-third of a halfpenny in their money. Mr. Clarke adopts, and endeavours to establish the opinion of Somner, who observed, from the laws of Athelflan, that the price of a threeman's life was, by the Angli, valued at 2000 thrimbus, which, by the Mercian effumne, was 1200 shillings; and if each of these sums denotes the same value, which is probable, then threimbus must be to the shilling as 2000 to 1200, or three parts in five of a Saxon shilling, i.e. three-pence.

The thrimbus was first coined in the reigns before Athelflan, during their greater affluence in cash, and designed merely for the convenience of exchange, as the most proper division that could be made in their money without a fraction, between the shilling and the penny. But when the shilling was reduced, it was of little use, and by degrees entirely laid aside.

Dr. Hikies obserues, that the method of computing by thrimbus was chiefly used in the more mercantile parts of this kingdom, among the East and West and South Saxons, and possibly coined only among them; for it appears that the inland provinces, the Mercians, reckoned generally by the shilling. Clarke's Comm. of the Roman, Saxon, and English Coins, p. 229, &c.

Thrin, in Geography, a river of Norfolk, which joins the Yare at Yarmouth.


Gen. Ch. Cal. Perianth inferior, of one leaf, minute, hemispherical, with six small, erect, marginal teeth. Cor. none. Stam. Filaments his, erect, equal, thread-shaped, about
Leontodon

Flowers

Leaves

Cylindrical

Application

Gouan.

Peric.

Ait.

Hall.

Corolla

Hort.

V.

Swartz.

Schreber

Linnceus

Avx^yi^i,

247.

2.1

170.

Thricia;


site formifolofulve, Linn. Cirrhaces; Juff.

Gen. Ch. Common Calyxx oblong, permanent, imbricated, of several linear, parallel, unequal, longitudinal, incumbent scales; those at the base very small. Cor. compound, imbricated, uniform; the florets numerous, all perfect, equal, monopetalous, ligulate, linear, abrupt, with five teeth. Stam. Filaments five, capillary, very short; anthers united into a cylindrical tube. Peric. none, except the permanent, straight calyx, at length reflexed. Sepals solitary, oblong, truncate, crowned with falcate feathery down, somewhat chafy in the lower part, and often unequal in the marginal florets; somewhat falcate in the central ones, frequently accompanied by shorter hairs or plumes. Recept. dotted, naked, or very flitily hairy.


This genus, though very natural and well defined, has the general habit of Hedyoopsis, or of Hieracium, agreeing with the latter in having some caulescent species, though in most the flowers are radical and single-flowered. The leaves are variously toothed or fimbriated, mostly hairy, rarely villous. Flowers of a full yellow. Root, except in our thirteenth species, perennial, tuberous. We adopt the English name of Hawk-bit from Petiver.


nois pyrenaica; Villars. Dauph. v. 3. 78, from the author. Picris fætalis; Allion. Pedem. v. 1. 211. t. 14. f. 4. Tiri- 

raeum folis integris dentatis, calyce hifidio, pappo plu- 

mbo; Hall. Helm. ed. 1. 741.) — Stalk radical, falcate, single-flowered, fealy; slightly timid, and somewhat hairy, at the top. Calyx hifid. Leaves lanceolate-oblong, slightly toothed, somewhat hairy. — Native of gayly pastures, on the Alps of Auffria, Switzerland, Dauphiny, and Italy. Haller found it on mount St. Gothard, Schleicher on mount Foulry, and the late Mr. Davall on St. Bernard. Our synonymy of Haller's first edition, entitled by Willdenow, rests on the authority of Allioni. We do not find the plant in his subsequent publications. The root is tuberous, perennial, with long fibres. Leaves from three to eight, radical, falcate, erect, obtuse, two or three inches long; tapering at the base; differently toothed about the middle or lower part: rough, with shaggy short hairs, particularly about their rib and footstalk; which latter is sometimes red or purple. Flower-footstalk from three to ten inches high, slender, erect, bearing a few feathery linear scales, and one yellow flower, hardly so big as our common Dandelion, whose calyx-scales are narrow, black with shaggy hairs.
A. erecta. Saffron-coloured Hawk-bit. Wildld. n. 3. (Leontodon croceus; Hafne in Jacq. Cod. v. 2. 16.)—

"Stalk radical, solitary, single-flowered, slightly falcate; tufted and hairy above. Calyx hispid. Leaves smooth, runcinate, with a triangular terminal lobe."—Gathered by Haenke on the alpine heights of Judenberg, in Upper Styria, where it inhabits dry, open, barren places, but is elsewhere rarely to be seen. This is said by Willdenow to be like the preceding, but different in the above-described figure of its leaves, which are only somewhat hairy. Flower an inch and half; or two inches, in diameter, very handsome, and readily distinguished from all the surrounding species of its own tribe, by its colour, which is that of tincture of saffron.

4. A. bistulis. Shining Spear-leaved Hawk-bit. Hoff. Syn. 423. Willd. n. 4. Ait. n. 1. (Leontodon bistulis; Linn. Sp. Pl. 1123. Jacq. Ait. t. 164. L. prothesis. B & C; Villars Dauph. v. 87. Picris n. 26; Hall. Helvet. v. 1. 12.)—Stalks radical, single-flowered, smooth as well as the calyx. Leaves ovato-lanceolate, smooth, with numerous slightly hooked teeth.—Native of the south of Europe; very abundant in Switzerland. The leaves are often a foot long, tapering at the base into purplish, flat, winged footstalks; their surface smooth, even, and somewhat glaucous; their margin cut into many deep, acute, triangular teeth, partly hooked backward. Stalks several, round, very smooth, glaucous, very rarely divided, twelve or eighteen inches high. Flower bright yellow, an inch and half wide, with scarcely any perceptible hairs on the calyx; drooping when in bud. Sometimes the flower-stalks bear a few linear distant scales.

5. A. dubia. Doubtful Hawk-bit. Willd. n. 5.—

"Stalk single-flowered, radical, nearly naked; hairy, as well as the calyx, above. Leaves lanceolate, toothed at the base, slightly clothed with forked hairs."—Communicated to Willdenow by Hoppe, from the Saltzburg Alps, under the above name, which seems to us to but too well applied. We have not indeed seen a specimen of this plant. Willdenow describes it as intermediate between the last and A. bistulis. The stalks are mostly furnished with one small scale, and are tufted under the flower, whole calyx, as well as the upper part of the stalk, beft with short forked hairs. The leaves seem smooth at first sight, but bear scaterred, white, forked hairs.

6. A. tuberosa. Knotty-rooted Hawk-bit. Willd. n. 6. Ait. n. 2. Sm. Fl. Græc. Sibth. t. 797, unpubl. (Leontodon tuberosum; Linn. Sp. Pl. 1123. Dens leonis bulbolus; Ger. Em. 290. Chondrilla altera Dioecorides, &c.; Lob. t. 232.)—Stalks radical, single-flowered, naked, somewhat hairy. Calyx hairy. Leaves pinnatifid, runcinate, somewhat lyrate, rough with forked hairs. Root of many ovate tapering knobs.—Native of the fouth of Europe and the Levant; very common in the fandy meadows of Greece, Cyprus, and Zante. The modern Greeks name it φαδος, or ραδος; and it may be, as some old botanists have thought, the κονιτάκα της of Dioecorides, but this is hard to determine. The perennial root is a clusater of fesilie ovate knobs, above an inch long, tapering into radicles. Leaves numerous, spreading, dark green, obtuse, either finely runcinate, with a large terminal lobe, or deeply, sometimes interruptedly, pinnatifid, and bluntly toothed. Flower-flanks several, a span high, ascending, filrated, more or less hairy; purple, like the footstalks, at their base. Calyx flender, with acute scales. Flowers above an inch wide, full yellow; red underneath.

7. A. incana. Hoary Hawk-bit. Scop. Carn. v. 2. 313. Willd. n. 7. Ait. p. 3. (Hieracium incanum; Jacq. Ait. t. 287. Linn. Sp. Pl. ed. 1. 799. H. fexatum montanum; Clus. Hilt. v. 2. 141. Ger. Em. 302. Leontodon hidpidam; Linn. Sp. Pl. ed. 2. 1124.)—Stalks radical, single-flowered, almoft naked, hoary as well as the calyx. Leaves lanceolate, erect, very minutely and sparsely toothed, hoary with lirary hairs.—Found on hills and mountains in Germany, Switzerland, Carniola and France. The root is long and woody, divided at the crown, where its bears several tufts of straight, upright, more or less acute, very hoary, leaves, tapering at the base, from three to five inches long, with a few little, marginal, glandular teeth. Stalks often foliary in each tuft, a foot high, flowering at the top. Flowers light yellow, an inch and a half broad. Calyces narrow, acute. The uniformly entire leaves, though beft with a few glandular teeth, and the structure of most other parts, when minutely examined, render this plant sufficiently distinct from A. bistulis, hereafter described, with which Linneus subsequefly confounded it as a variety.

8. A. Taraxaci. Dandelion-leaved Hawk-bit. Willd. n. 8. Ait. n. 4. Compend. Fl. Brit. n. 3. (Hedypnois Taraxaci; Villars Dauph. v. 3. 82. t. 26. Fl. Brit. 825. Eng. Bot. t. 1109. Hieracium Taraxaci; Linn. Sp. Pl. 1125. Retz. Obs. ffig. 4. 30. t. 2. Lightf. Scot. 435. Picris n. 27; Hall. Fl. Brit. t. 1. 12. P. Taraxaci; Allion. Ped. v. 81. t. 31. f. 1.)—Stalks radical, mostly single-flowered; tufted and hairy at the top. Leaves smooth, with recurved teeth. Calyx hairy,—Native of wetty pastures on the loftied mountains of Lapland, Scotland, Wales, Switzerland, Savoy, and Dauphiny, flowering in July or Augulf. Root abrupt, with long lateral fimple fibres. Herb very variable in the breadth of its leaves, as well as the number, height and luxuriance of its flower-flanks. The former are either lanceolate, and almoft linear, or spatulate and obovate, sharp or blunt, from two to four inches long, with fhallo or very deep, always runcinate, teeth. The latter are ascenfing or erect, foliary or in pairs, sometimes, though rarely, divided, naked or furnifhed with a few linear scales, fragiary with black hairs at the top, as is likewife the broad and thick calyx. Flowers an inch broad, or more, of a full yellow, with brownifh terminal feet. Germin furmifhed with a taper neck, like a italk, but as the feed fwellis, this appearance vanifhes, and the feathery down is truly fefile. Receptacle naked. Willdenow juftly remarks, that Gouan's fynonym is misapplied to this species in the Fl. Brit. We have now quoted it more correcfly under our fecound A. alpina, to which fome of the flender varieties of the preffent bear a great refeemblance. Solander, as well as Linneus, thought this plant a mule between Hieracium alpinum and Leontodon Taraxacum, merely because its flowers refeembed one, and its leaves the other. The generic character differs from both.

9. A. autumnalis. Autumnal Hawk-bit. Hoffm. Germ. for 1791. 274. Willd. n. 9. Ait. n. 5. Compend. Fl. Brit. n. 4. (Hedypnois autumnalis; Fl. Brit. n. 4. Eng. Bot. t. 830. Leontodon autumnale; Linn. Sp. Pl. 1123. Hieracium minus; Fuchs Hilt. 320. H. minus, five leporiform; Ger. Em. 296.)—Stalks radical, branched; their ultimate divisions falcate. Leaves lanceolate, toothed, or pinnatifid, smooth. —Native of meadows and pastures throughout Europe, flowering in autumn; very common in Britain. The root is abrupt, with very long and copous fibres. Leaves numerous, variably and unequally pinnatifid, or merely toothed, rarely a little rough or shaggy, oblique, or somewhat fterpentine, in their general form or poftion. General flanks one or more, a foot or two in height, spreading, curved and zigzag, alternately branched, not quite without puberfence, terminating in a few long ficaly
10. A. crispus. Curled Hawk-bit. Willd. n. 10. Ait. n. 6. (Leontodon crispum; Villars Dauph. v. 3. 84. t. 25. Hieracium alterum fasicato montanum; Colum. Eecfr. 243. t. 243. H. parvum hirtum, caule aphylo, crispum ab fucetum; Bauh. Hill. v. 2. 1038.)—Stalks radical, almost naked, single-flowered, hairy as well as the calyx. Leaves with various disarticulated teeth and segments, rough with dense three-forked hairs. Seeds with a rough elongated b-sk.—Native of rocks in Dauphiny, Switzerland, and Italy.—The root is said to be very long, thrusting itself deep into the scarcely visible crevices of large rocks, and sending forth many long, simple, lateral fibres. Leaves numerous, in dense spreading tufts, from two to four inches, Columna says more than six, in length, pinnatifid in a rather lyrated manner, some of their segments or teeth turned various ways, especially, as J. Bauhin observes, when dry; they are densely clothed, on both sides, with prominent hairs, whose peculiarly white tips have three or more spreading forks or points. Flower-stalks ascending, a span high, furrowed, bearing a few linear scales near the top. Flower full an inch broad. Seeds uniform, each terminating in a long, tapering, brown, minutely rough beak, which looks like a stalk to the dense feathery down. This species comes very near the following, but appears to be essentially distinguished by the beak of the seeds. Villars confounds its synonyms with those of A. hirta, which differs very materially in having a feally short crown to its marginal seeds, as will hereafter be described.

11. A. bifida. Rough Hawk-bit. Willd. n. 11. Ait. n. 7. Compend. Fl. Brit. n. 1. (Hedyphoia bifida; Fl. Brit. n. 1. Engl. Bot. t. 1554. Leontodon bifida; Linn. Sp. Pl. 1124. Curt. Lond. f. 5. t. 56. Fl. Dan. t. 1562. Hieracium dentis licis folio, hifrutum; Ger. Em. 303.)—Stalks radical, naked, single-flowered. Leaves with recurved teeth, rough. Florets hairy at the orifice; glandular at the tip. Seeds scarcely beaked.—Very common in meadows, pastures, and waste ground, throughout Europe, from Sweden to Greece, flowering in summer. The root is tapering, zigzag, long and slender. Leaves oblong, more or less deeply toothed, or in some measure pinnatifid, their teeth acute, pointing downwards; they are much less densely hairy than those of the leaf, their hairs generally simply forked only; but we are aware of the uncertainty of this character. Stalks several, upright, frayed, clothed with similar hairs. Flowers drooping while in bud; afterwards erect, bright yellow, an inch and half broad. Calyx hairy; its outer scales lax and scattered. Flowers with a tuft of long yellow erect hairs, at the top of their tube externally; their summit terminates in five teeth, at the back of each of which Mr. Sowerby first detected a small triangular cluster of brown glands. These two characters serve admirably to distinguish the present species from every other British one, but the first of them, if not the other, is found in A. crispus. The seeds however have not near so long a beak as in that species, and they differ from A. hirta in being all uniformly furnished with a feathery crown. It is curious to trace an affinity of the seed-down being flaked in this species, published by Wildenow, taken from Haller, on the authority of Reichard. On turning to Halkr, n. 25, we find he trusted to Berkhey, who, in his

Flores Compositi, t. 6. f. 10, has figured a seed, supposed to belong to the plant before us. On examination however its crown proves to consist of simple, not feathery, rays, and therefore it has nothing to do with any Apargia. We mention this circumstance, to shew the mischief of taking things for granted; not only in botanical criticism, but any other inquiry of the human mind.

12. A. hirta. Deficient Hawk-bit. Hoffm. Germ. for 1791. 274. Compend. Fl. Brit. n. 2. (Thrift. Catal. v. 1. 98. Willd. Sp. Pl. v. 3. 1554. Ait. Hort. Kew. v. 4. 447. Hedyphoia hirta; Fl. Brit. n. 2. Engl. Bot. t. 1555. Leontodon hirtum; Linn. Sp. Pl. 1123. Curt. Lond. f. 5. t. 59. Rhagadiulus n. 7. Hall. Hill. v. 5. 5, with some doubtful synonym.)—Stalks radical, naked, single-flowered. Leaves toothed, rough. Calyx nearly smooth. Outer row of seeds definite of down.—Native of gravelly heaths and waste ground throughout Europe. Dr. Sibthorp gathered it, along with our violets and primroses, in Arcadia. Mr. Curtis observes that this species seldom occurs on the same spot with the preceding, of which Mr. Hudson made it a variety. Other botanists have found great difficulty in distinguishing them under all their various appearances, whilst Haller, and more recently Roth and Wildenow, have separated them generically. Linnaeus thought the simple hairs of the plant before us afforded a good mark; but this is fallacious. The herbage of both is nearly the same, or at least their varieties closely approach each other. The flowers of both droop in the bud, but those of A. hirta are the smallest; their florets orange beneath, defunct of hairs about the orifice, and of glands at the summit. The most effential difference of all is found in the seeds of the circumference, which have no feathery down, but instead thereof a crown of short jagged scales. The root is abrupt, or bitten off, not tapering.

13. A. annua. Annual Hawk-bit. (Thrift. Catal. v. 1. 99. Willd. Sp. Pl. v. 3. 1555. Hysteris taraxacoides; Villars Dauph. v. 3. 166. t. 25, excluding the synonyms.)—Stalks radical, naked, single-flowered. Leaves lanceolate, toothed, rough with forked hairs. Calyx hoary and hispid. Outer row of seeds definite of down; those of the disk beaked.—Native of Spain and France, in sandy ground. The annual fibrous root distinguishes this from all the other known species, and especially from the last, with which the short crown of its outer row of seeds agrees. The rest of the seeds however are elongated at the summit into a slender beak, which elevates the feathery down, as on a lengthy stalk, but is not really such. The rough and hoary calyx, and the brighter green of the leaves, are further differences. The name of bifida being preoccupied, see sp. 11, we are obliged to select a new one for the present species.

14. A. Villarsii. Villarsian Hawk-bit. Wild. n. 12. (Leontodon hirtum; Villars Dauph. 82. t. 25, excluding the synonym.)—Stalks radical, naked, single-flowered, nearly smooth as well as the calyx. Leaves deeply toothed, or pinnatifid, rough with simple awl-shaped bristles.—Native of dry funny rocks in Dauphiny, Wildenow, who had a dried specimen, says the leaves are hoary with copious white hairs. We have not seen the plant, nor dare we attempt an illustration of it; Villars having fo confounded various synonyms under this and his Leontodon protheciformes, p. 87. t. 24, that, even with some of his specimens before us, the descriptions are not satisfactory.
grassy pastures on the Caucasian Alps, flowering in August
and September. Root perennial, abrupt. Leaves with
triangular, nearly entire lobes pointed backward, be-
sprinkled on the upper side with decumbent hairs, so
sparingly that they seem altogether smooth. Stalk longer
than the leaves, flared, naked except a minute scale or two;
a little tufted and downy under the calyx, which is blackish,
though hispid, though thickly matted with whitish hairs.
Flower of a full yellow. 

Seeds smooth to the naked eye; their downy, feathery.
This plant has the habit and stature of _A. bifida_, n. 11,
but differs in the want of hairs on the stalk, as well as in
the form and position of the pubescence of the foliage.


Wild. n. 13. (Leontodon coronopifolia; Desfont. Atlant. v. 2. 239. t. 214.)—Stalks radical, single-flowered,
feally, shorter than the leaves, hairy as well as the
calyx. Leaves pinnatifid, with blunt lobes, rough with
forked hairs.—Native of the sandy deserts of Barbary, near
Casfa. The whole plant is rough with branched hairs.
Leaves three or four inches long, spreading on the ground,
unequally, but rather regularly, pinnatifid. Stalks several,
ascending, an inch or two high. Flowers yellow, an inch
broad.


Marlch. a Biebertl. Caucaf. v. 2. 248. (Leontodon his-
pidum; Cavon. 10. v. 2. 39. t. 149, excluding the sy-
nonym.)—Stems leafy, mostly single-flowered, hairy as well as
the calyx. Leaves oblong-lanceolate, toothed or pinnata-
ifid, rough, with forked hairs.—Native of hilly situations
in Spain, flowering the beginning of May. Frequent also
in Tauria. This, as Willdenow remarks, differs as much as
possible from _A. bifida_. The whole herb is even more
soft or finely than that species. Stems six inches high,
with divided lanceolate scales, accompanied by some ob-
long, obtuse, entire or toothed leaves, an inch or inch and
half long. The radical leaves are much more numerous and longer,
tapering at the base, gradually dilated upward, blunter
leafed, or in some degree pinnatifid. Flowers terminal,
foliaceous, pale yellow, near an inch and half broad.

n. 8.—Stems leafy, somewhat branched, hairy. Calyx
smooth. Leaves lanceolate, runcinate, hairy, with forked
bristles.—Native of rocky woods in Hungary, near the
baths of Hercules. Very nearly akin to the last, but
the more branching _flora_, runcinate leaves, and smooth very eleft-
prepared scales of the _calyx_, fringed at the edges only, not lax
and hairy, appear sufficient, as Willdenow thinks, to differ-
ent this species.

Caucaf. v. 2. 249. (Scorzonerla alpifera; Willd. Sp.
Pl. v. 3. 1578. S. bifida; Forsk. Egypt.-Arab. 215.)—
"Stems leafy, hispid, bearing one or two flowers. Calyx
strongly; the margin and keel of its scales fringed with
bristles. Leaves lanceolate, toothed, hispid, with forked
hairs. Seeds rough."—Native of dry open places in Ibn-
ria, and the eastern part of Caucasus, flowering in June.
Forskall found it at Efías, near Marfellhes. We have
already described this under the article _Scorzonerla_, n. 32.

The able author of the _Flora Turcico-Caucasica_ says, "the
leaves and flowers are extremely hispid.; the _calyx_ only hoary,
exto the edges and keels of the scales. Stems bearing
one or two flowers, and from one to three flowers, like _A. his-
picana_. Flowers pale yellow; the outermost purple beneath.

Seeds brown, linear, tapering much at the top, as in the
_Scorzonera_; they are rough with minute prominent points.

Down featherly. The habit of this plant, and its affinity to
_A. hispanica_, n. 17, and _inca_, n. 7, make it rather an
_Apargia_ than a _Scorzonerla_." We have seen no specimen.
The regularly imbricated membranous-edged scales of the _calyx_
in the latter, and the naked tips of its _seed-scales_, are suffi-
cient indications of this genus, and if not found in the
present plant, there can be no doubt upon the subject
but of this we are left in ignorance.

n. 16. (Hieracium variegatum; Lamarck Dict. v. 2.
362.)—Stems nearly leafless, somewhat branched, hairy.
Radical leaves oblong, strongly toothed, hairy towards the
edges. Calyx-scales spatulate, flat; downy at the base and
margins.—Gathered by Commeron at Monte Video. The
root feems rather woody. Stems several, six inches high,
each terminating in one large yellow or orange-coloured
flower, and bearing several linear acute scales, with the
rudi-
ments of branches; but we find none of the pinnatifid
leaves mentioned in Lamarck. The numerous radical leaves
are two inches long, tapering at the base, bluntest, with
coarse blunt unequal teeth, green, not hoary; fringed with
simple black hairs about the margin and mid-rib on both
sides. The dilated, obtuse, smooth scales of the _calyx_ are
more regular and copiously imbricated than usual in this
genus, and are prettily variegated with white marginal cot-
tony down. The _seed-scales_ are feathery, but of the _seeds_
or _receptacle_ we can see nothing.

n. 17.—"Stem branched at the top, hairy. Leaves ob-
long-lanceolate, hairy, toothed. Hairs forked."—Native
of Galatia. Willdenow, who had a dried specimen, de-
scribes this plant as resembling _Hieracium murorum_.
The _stem_ is erect. Leaves feellive, an inch and a half long.
Flower-lasts: feally and hairy. Down feellive, feathery.
Receptacle naked.

THRINNIUM-GILD. See _Trinimum-Gild_.

THRIO, 2 hips, in Antiquity, a festival in honour of
Apollo.

THRIPS, in _Natural History_, a name used among the
ancients to express a sort of worm hatched from the egg
of a beetle: which, while in the worm-state, eats its way
into wood, and forms cells and cavities in it of various
shapes, and in various directions, often resembling the
figures of letters or other things. See _Enxylon_.

The ancient Greeks are said to have used small pieces of
the wood thus eroded in particular forms, as seals, before
the engraving of these utensils was invented; and indeed
they must very well have served this purpose, since it is
fearfully possible to conceive how one of these pieces of
cor-
rodden wood should be counterfeited, or the impression
imitated.

Lucian mentions his marking his olives with a signature
of one of these pieces of wood greatly eroded, and ues
the word _thrips_, not as the name of the animal, but of
the piece of wood eroded by it. Theophratus, Pliny,
and Aristotle, also use the same expression; and we find
that the word _thrips_ was as frequently used to signify
the pieces of wood eroded, as the animal which eroded
them.

Thrills, in the _Linean System of Zoology_, is a genus of
the order of Hemiptera, the characters of which are, that
the rostrum is obsolete, being hidden within the mouth;
the an-
tenna filiform, and as long as the thorax; the body slender,
and of equal thickness; the abdomen reflexible, and often
bent upwards; the four wings extended, incumbent, nar-
row,
row, and crossing one another at some distance from their base. The thrips has six feet, and the tarsus of each foot has only two articulations. Gmelin enumerates the following eleven species.

**Paradoxia.** Brown, with abbreviated wings, and antennæ pectinate, filifide and filiform. Found in China, but Gmelin doubts whether it be of this genus.

**Physalus.** With glaucous elytra or shell-wings, and black body. Found frequently on flowers in Europe.

**Minutissima.** With glaucous elytra and body, and brown eyes. Found as the former.

**Juniperina.** With snowy elytra and brown body. Found in the galls of the juniper.

**Ulm.** Black, with snowy ciliate wings, and acuminate anus. Found gregarious on the bark of the elm.

**Urtica.** Yellow, with whitish elytra. Found solitary on the leaves of the nettle, vine, and hazle.

**Fasciata.** With elytra banded with white and black, and brown body. Found on flowers in Europe.

**Busca.** Blackish, with glaucous elytra. Found in Denmark: the female probably falcated?

**Obscura.** Yellowish, with palish elytra, and eyes and wings of the abdomen black. Found in Denmark.

**Rufa.** Red. Found on the spikes of wheat; if it be not the larva of the minutissima.

**Variegata.** Variegated. Found on flax.

The thrips is highly injurious and destructive to many sorts of fine fruited trees, but particularly so to those of the grape or vine kind. The bell and most effectual means of preventing its mischiefous effects, in such cafes, is probably that of frequent good washing of the trees with common water, by the engine or otherwise. It has lately been advised that this should be done every evening, as, when performed in the heat of the sun, the vines are materially injured. Indeed all such trees should, it is suppos'd, be well washed every evening, until the berries begin to colour, whether infested with insects or not, but especially in the former state; after which it is to be wholly discontinued.

Where there is a neglect of washing the trees in this or some other way, the thrips, for the most part, makes its appearance. In such cafes, these insects may without much difficulty be destroyed by the fumigation of tobacco and damp hay; the plants or trees being well washed after it by pure water.

The *sulphur-bug* is another insect which is often very hurtful to peach-trees and vines in forcing-houses; and the cause of which is believed to be much owing to the trees not being daily properly washed in the above manner.

Each of these sorts of trees stand in need of particular management in clearing them of this insect.

The *brown-bug* too occasionally makes its appearance on, and is hurtful to peach-trees in such situations, especially when they are shaded, or approach near the flues of the houses. Proper washing of the trees, in these cafes, with lime-water, in the winter season; and fyring them with it as soon as the leaves have fallen off, are often very effectual in removing such insects.

The *green-fly* is also very destructive to peach-trees, especially when in the forcing flate. These are the most effectually destroyed by means of well washing the trees daily in a regular manner, after the work of forcing is begun. It is the common practice of most gardeners to discontinue such washings as soon as the flowers begin to make their appearance, but others have lately continued them with supposed advantage, and not found them to prevent the fruit from setting. If any flies of this sort prey on themselves, they may be kept under by proper watering or washing, as above, and by carefully picking off the first buds on which they appear, which is found to prevent them from breeding, and to render the use of tobacco-smoke unnecessary. Fumigations of this substance are, however, sometimes beneficial in these cases in removing the vermin.

This and the *blue-fly* too are often very injurious to plum-trees, especially after they have been affected with the honey-dew. The manner of getting rid of them in such cafes, which has lately been recommended, is that of watering the trees in a plentiful manner two or three times a week, if the weather be dry; and during the continuance of the above fort of dew upon the trees, preparing the water with a little common salt and the fluid part of a good portion of broom that has been boiled. This mixture, it is said, effectually kills the flies, while it does no injury to the trees, if care has been taken not to use too large a proportion of salt. This practice also tends to make the trees shoot stronger, and to hinder such insects from breeding.

There is another insect which has lately been found to be greatly injurious to apple and other fruit trees, but which is yet only little known to gardeners. It is the *Tortrix ovabarea*, which may be seen well described in the second volume of the "Transactions of the Horticultural Society of London." It is there stated to be occasionally very hurtful to such trees, not only in the larva flate, but others; and that its attacks are by no means confined to the diseased parts of such trees. The insect in its perfect flate is a small moth, which is very abundant in gardens and fruit grounds.

In what regards the means of removing and destroying such insects when their attacks become injurious, the hints given below are thrown out. The frill and moist essential procès evidently is, it is thought, to cut away the edges of the canker parts where they are chiefly found, making the wound smooth, and covering it with any composition likely to prevent the moth from depositing her *œva* or eggs there again. One precaution is necessary, which is to put into boiling water, or to bury at a considerate depth, the cut-out pieces of decayed bark containing the larve; which, if left near the tree, would soon crawl from their holes or other places, and remount it; thus defeating the labour of the horticulturalist, who often, from neglecting a flight additional trouble, loses the benefit of many painful exertions. Where the larve are found to have infamated themselves generally into the rough bark of old trees, it would probably, it is thought, be advisable to scrape off the whole of the life-leaves bark, and such portions of the alburnum as are injured, as suggested by Mr. Knight on another occasion; a process which, there can be no doubt, it is said, would be advantageous to the tree in other respects, as pointed out by the above writer. And where projecting fav-dlut-like maffes shew that the larve has attacked even smooth-barked trees, the infection of a blunt prickler into the hole would probably, in moss cafes, suffice to destroy it, and do less injury to the tree than suffering it to attain its growth. But the mode which is most to be recommended in this, as in the cafe of almost all insects hurtful to fruit or other trees, is, it is said, to destroy the moths themselves by collecting them from the trees, or other places, during the summer months, which might be done by children properly directed and provided with suitable means for the purpose, or in other ways. The destruction of every female moth, before the deposition of its eggs, may, it is said, be fairly calculated to prevent the
existence of some hundreds of large; and thus, in any
garden or fruit-ground not in the neighbourhood of others,
where the same methods are neglected, the whole race
might, it is supposed, be exterminated in a few years.

THRISSA, in Ichthyology, the name given by the
Greeks and by the modern Latin writers to the fish which
we call the thad, or the mother of the herring.

THRIVING, in Neat Cattle, a term made use of by
grazers and other flock-farmers to signify the property
they have of doing well on the food they consume, or of
fattening kindly, in contradistinction to that of a flunted
unthrifty growth, or bad sort of feeding. It is mostly
known by the hides or coats of the beasts having a mel-
lowness of feel in handling them, with a fineness and sleek-
ness in their appearance. This depends, in a very great
degree, upon the pile and growth of the coats, for the
shorter and sleeker they are, the more thriving the beasts;
as, on the contrary, in proportion to length and hardness,
is the unthriftiness of the flock.

A coarse, rough, thick hide is an indication too of hard-
ness of flesh in beasts; while, on the contrary, fineness and
cleseness of grain in it, give the feel of fine texture in the
hide.

These circumstances demand great attention in choosing
neat cattle for all purposes.

THRIVING Drinks, such drinks as are prepared and given
to neat cattle, or other beasts, when in a low unthrifty state.
They are mostly composed of the powders of different
sorts of aromatic seeds, such as those of aniseed, cardaway,
seeds, and grains of paradise, in the proportion of about
two ounces of each; which are mixed well together and
put into a quart of warm ale, in which they are given to the
beasts; or of sweet fenel seeds and cummin seeds,
each two ounces, long pepper, ginger, turmeric, and
demecampane, each one ounce, mixed together, to be given in
the same way as above, to which sometimes a little fresh
butter and treacle or coarse sugar are added. Snake-root
and gentian root, in powder, too, are sometimes employed
in such drinks.

As the principal effect of such drinks, for the most part,
depends upon the effential oil the substances may contain,
they will be somewhat preferred and increased by giving
them in the above manner.

The most proper management for the beasts in these cafes,
is to change their food as much as possible for the better,
letting them have occasional good mashes of feedled bran,
ground malt, or other such substances, with a small propor-
tion of ground oats or barley meal put into them: warm
water may also sometimes be necessary.

By the use of drinks of this sort, very reduced cows and
other neat cattle may often be readily restored and brought
into a thriving condition.

THRIXSTEMPERUM, in Botany, so called by Lou-
reiro, from 6, z, a hair, and sperma, seed. We cannot lay
much for the construction of this word, which should have
been Trichospermum, provided there be no dormant chain to
that name; but it is not worth changing, till we are better
affirmed of the genus.—Loureiro. Cochinchin. 510.—Clas.
and order, Monandria Monogyne. Nat. Ord. Orchids?

Gen. Ch. Common Calyx catkin-like, linear, compressed,
flexible, with alternate, acute, single-flowered scales. Pe-
rianth none. Cor. Petals five, linear-awlshaped, long, erect,
nearly equal. Nectary attached to the receptacle, between
the two lowermost petals, deeply divided into two lips; the
inner one three-clitell, embraced by the petals, its lateral
segments short and blunt, the middle segment longest, co-
nical, ascending; outer one ovate, undivided, prominent
beyond the petals. Stam. Filament solitary, thread-shaped,
short, attached to the pistil; another ovate, of two cells,
with a lid. Pist. German thread-shaped, straight, bearing
the flower; style thick, unequal, standing on the base of the
nectary; stigma simple. Peric. Capsule oblong, tri-
angular, the angles acutely emarginate, of three valves and
one cell. Seeds numerous, long, very slender, like hairs.

Eff. Ch. Petals five, linear, erect. Outer lip of the
nectary ovate, prominent.

1. Th. centipes. Nham goi rit of the Cochinchines.
Found in Cochinchina, creeping upon the native trees.
The stem is parifitical, long, compressed, perennial, creep-
ing by means of simple, very short, lateral roots. Leaves
linear-lanceolate, entire, small, sheathing. Flowers
pale yellow, with a reddish nectar, in straight, lateral,
catkin-like, two-ranked spikes.

We guess this to be allied to some of those parifitical
Orchids, formerly referred to Epipedium by Linneus;
and by Swartz chiefly to Cymbidium. The structure of
the whole tribe is so obscure, that Loureiro may very well
be excused if we cannot entirely unravel his description.

THROANA, in Ancient Geography, a town of India,
on the other side of the Ganges, which Ptolemy affigns
to the people called Lelit, or pirates.—Alfo, a town of Serica,
near the mountains in the vicinity of Amfimara. Ptolemy.

THROAT, the anterior part of an animal, between
the head and the shoulders, in which is the gullet.

Physicians include, under the word throat, all that hollow,
or cavity, which may be seen when the mouth is wide open.
It is sometimes also called 1blimus, because it is narrow,
and bears some refeemblance to what is called by geogra-
phers 1blmus.

THROAT, Sore, in Medicine. See Quinny.

THROAT, Wounds of, in Surgery. See Wounds.

THROAT, in Architecture, Fortification, &c. See Gorge
and Cul.

THROAT, in Ship-Building, the inside of knee-timber
at the middle or turn of the arms. Alfo, the middle part
of the floor-timbers; the inner part of the arms of an anchor,
where they join the flunk; and the inner ends of booms and
gaffs, where they traverse round the maff.

The throat is opposed to peak, which implies the outer
extremity of the said gaff, or that part which extends the
fail behind. Hence the ropes employed to hoist up and
lower a gaff, being applied to those parts of it, are called
the throat and peak haliards. Falconer.

THROAT-WORT, in Botany, the name of a perennial
weed common in pasture grounds. The flalk is cornered
and undivided. The flowers grow in bunches at the top of the
flalk. They are erect, of a beautiful purple colour, and
divided in the middle into five acute segments. It is a very
pernicious weed when suffered to get a-head in such lands,
and not capable of being defroyed without considerable
difficulty and trouble. See Trachelium.

This plant yields, when wounded, a milky juice in great
plenty, and this, if received into a shell or other small vesel,
curdles immediately, and the whey runs from the thick
part; this whey is of a brown colour, whereas that of the
wild lettuce is of a fine purple, and dries into a cake that
may be crumbled into a purple powder. The juice of the
throat-wort smells four, and its curdled part, being dried,
burns like resin at the flame of a candle. Phil. Trans.
N° 284.
should never be allowed to become too ripe when intended to be cut in this manner. The term is also occasionally applied to some other purposes in husbandry.

**THROGGY**, in Geography, a river of Monmouthshire, which runs into the Severn, 4 miles S.W. of Chepstow.

**THROMBUS**, from ὀμβρος; coagulated blood, a clot of blood. The term has also been applied to a tumour, formed of a collection of extravasated blood under the integuments after bleeding. When such an extravasation, though of some extent, is not considerable, it is usually called an *echymosis*; which see.

A thrombus sometimes depends on the surgeron having totally divided the vein; but much more frequently on his not having made the opening in the vein properly correspond to that in the skin. The patient's altering the posture of his arm, while the blood is flowing into the bain, will often cause an interruption to the escape of the fluid from the external orifice of the puncture; and, consequently, it insinuates itself into the cellular substance in the vicinity of the opening in the vein. In proportion as the blood issues from the vein, it becomes effused between the skin and fascia in the interstices of the cellular substance, and this, with more or less rapidity, and in a greater or lesser quantity, according as the edges of the skin impede or let the outward escape of the fluid. Sometimes, also, a thrombus forms after venesection, when the usual dressings, compretts, and bandages, have been put over the puncture, and the patient imprudently makes use of the arm on which the operation has been done. This is more particularly liable to happen when a very large opening has been made in the vein.

The accident is not attended with any danger when the extravasation is inconsiderable; for, in this circumstance, the tumour generally admits of being easily resolved by applying to it linen dipped in any stimulant lotion. If the swelling should be more extensive, applying to it a compress wet with a solution of common sea-salt, is deemed a very efficacious plan of promoting the absorption of the extravasated blood. Brandy, and a solution of the muriate of ammonia in vinegar, are likewise eligible applications.

It sometimes happens, that a thrombus induces inflammation and suppuration of the edges of the puncture. The treatment is now like that of any little abscess: a common linseed poultice may be applied, and any considerable accumulation of matter should be prevented, by making an opening with a lancet in proper time. As soon as the inflammatory symptoms have ceased, difficients should be refuted to again, for the purpose of drying the remaining clots of blood and surrounding induration. Cooper's *Dict. of Practical Surgery*.

**THRONE, θρόνος, a royal seat, or chair of state, enriched with ornaments of architecture and sculpture, made of some precious matter, raised one or more steps, and covered with a kind of canopy.

Such are the thrones in the rooms of audience of kings, and other soveigns.

**THRONTION, or THRUMON, or THRUMON, a town belonging to the Locrians, situated according to Strabo, 20 miles from the sea.

**THRUMONIA, a town of the Abantides, was a district of Thespatoria, in Epirus, towards the Ceraunian mountains. On the return from the war of Troy, when the ships of the Greeks were dispersed, the Locrians of Thrumon, and the Abantes of Euboea, were driven with eight vessels towards the Ceraunian mountains. They esta-blished themselves in this place, and built a town, which they called Thrumon, and they gave the country the name of the Abantide. They were afterwards expelled by the Apolloniates.

**THROO, or THROUGH, in *Agriculture*, a term signifying a breadth, lip, or width of corn, which a set of reapers, &c. drive before them at once, whether it consist of one or more lands or ridges. The mode of reaping by means of throats is very common in some of the northern counties of the kingdom, and suppedo by some to greatly expedite the work.

**THROPPLE, among country people, denotes the wind-pipe of a horse.

**THROSTELE, or Song-Thrush, *Mavis, or Turdus muscius* of Linnaeus, in *Ornithology*, is called by authors the *turdus verrisveris minor*, to distinguish it from the larger species, called in English the mistle-thrush, and usually known among us by the simple name of thrush. It is called *vveri- verris* by authors, from its resemblance in colour to the other *vveri-verrius*, not from its feeding on the misletoc-berries, as that does.

It resembles the mistle-thrush in colour, except that the inner coverts of the wings are yellow.

It feeds on worms, frogs, and small insects, and remains with us the whole year. It builds with moss and stubble, and lines the nest with mud. On this it lays five or six eggs, which are of a blueish-green, variegated with a few black spots. It fits on hedges and bulrushes, and sings very agreeably.

The throstle is the finest of our singing-birds, not only for the sweetness and variety of its notes, but for the long continuance of its harmony; as it obliges us with its song for nearly three parts of the year. See Turdus.

**THROSTLING, a disease of black cattle, proceeding from humours gathering under their throats; by which means their throats are fo dangerously swelled, that they will be choked, unless reasonably relieved by bleeding.

**THROUGH-STONE, in *Rural Economy*, a term which signifies a long stone which fills the whole breadth of the wall in making fences of that kind, and which binds them together in a more perfect manner than would otherwise have been the case. It is always of great importance to have plenty of throughs in fences of this nature, from almost the bottom part to near the top.

**THROW, the provincial name of a turner's lathe.

There is a great variety of these sorts of tools in use for different purposes. See Lathe.

**THROW the Glove. See Glove.

**THREWED SILK. See Silk.

**THROWSTER, one who prepares raw silk for the weaver, by cleaning and twirling it. See Milling and Silk.

**THRUM, in *Gardening*, among the cultivators of fine flowers, is a term applied to the thread-like internal bulby parts of them, and which, in some sorts of good flowers, such, for instance, as the auricula and other similar kinds, should be of a bright colour, and the chives, or thready bristles; of which it is composed, clear and shining with spangles, somewhat like gold-dust; and they should also be distinct from each other, leaning inwardly towards the pipe; as when they appear platted together, or look battered or mis-shapen, the beauty of the flowers to which they belong is much impaired; which is not unfrequently occasioned by the wild and other bees, which, when in search of honey or food, are apt to greatly hurt such parts of fine flowers.
flowers. The bees, in such cafes, should be carefully taken
by proper means, and be presented as much as possible from
collecting their food from such fine kinds of flowers.

TRHUM-Cap Island, in Geography, a low woody island,
of a circular form, and not much more than a mile in com-
pass, in the South Pacific ocean, covered with verdure of
many hues, but without inhabitants, discovered and so
called by Cook in April 1769. S. lat. 18° 36'. W. long.
139° 4'.

TRHUM-Wort, in Agriculture, a troublesome weed in
some lands of the rather moist down kind, which is of the
perennial sort.

TRHUMMING, in Rigging, denotes interchanging short
pieces of thrums, or rope-yarn, in a regular manner into
matting, through intervals made by a fid, or large needle.

TRHUST, an affection of the inflammatory and sup-
purring kind in the feet of the horse, and some other
animals. In the horse it is an inflammation taking place in
that part of the foot termed the flable frog, which is
most frequently occasioned from want of due cleanliness in
it, especially in those of the team or working fort, from the heels
being in a contracted state, or from flowing upon erroneous and
bad principles, but most commonly from the last of
these causes. See SHOEING.

The disease may be known to be present in this, as well
as in other animals, by a tenderness and uneasy feel being
shown on pressing the frog, or affected part, and its
being accompanied with a discharge of matter of the pruri-
ient kind, as well as by other similar appearances.

The means of removing the complaint in the horse, when
inflammation is chiefly present, consists in taking away
the shoe, and lowering the heels, in such a manner as that
the frog or discolored part may come in contact with the
ground or floor; after which the animal may be suffered
to stand some days without shoes, the part being well
washed two or three times a day with a common flable
brush, and a solution of soft soap in rain-water, an appli-
cation composed of white vitriol, Armenian bade, and alum,
in fine powder, of each half an ounce, mixed up with com-
mon tar, in a sufficient proportion to make a fort of ointment,
being then had recourse to as a dressing. This may be
used spread upon lint, being applied between the eft of the
frog, or affected part, and renewed as often as there may be
a necessity.

It is likewise advised by some, that all the discolored parts,
in such cases, should be carefully removed by means of a
drawing-knife, and that if the animal be not allowed to have
reft, a bare -hoe must be had recourse to, until the disease
becomes quite removed. It is thought, too, that three or
four pints of blood may often be taken away with advan-
tage in cases where there is much inflammation, and masses
with nitre may be given in the evenings. Much benefit al-
so may sometimes be found from the use of diuretic bales, and
from the foot affected being fomented with warm water,
in which a handful of common salt has been dissolved, juft
before the application of the above dressing. Great utility
is occasionally derived, too, from the infusion of a feoton
or rovel in the eft, or other proper part, and letting it
continue some time. See SHOE.

In cases where the complaint proceeds chiefly from con-
tacted heels, some suppose the only certain and effectual
mode of removing the affection is, perhaps, that of the ufe
of the artificial, or patent frog, not long ago invented by
Mr. Coleman, who has bestowed much attention on the
feet of animals, especially of the horse. See FROG.

In other animals, where the hoofs, claws, or other parts
of the feet are affected with inflammation, and collections
or discharges of matter, in some measure of the thrush kind,
or having some resemblance to it, the best means of relief
are probably those of first trying the effects of difcuent
ificant applications, and if these do not succeed, to have
recourse to warm emuient fomentations or poultices, then
cutting or paring the parts down so as to lay them well
open, and let out any thing they may contain, dressing the
openings with mild echaritics, as there may be occasion.
In this way, very troublesome affections of this fort may
often be speedily removed.

TRHUS, in Medicine. See APHThE and INFANT.

TRHUS, in Ornithology, is the turdus oiseauvus of Lin-
neus, and is the largest of the genus. See TURDUS and MIS-
SELA BIRD.

TRHUSK, See THIBSK.

TRHUST, in Fencing, is an action of which there are
three kinds. To thrust in carte, is to throw your hand as far
as possible on the inside, with the point of your fword to-
wards your adversary's breast: to thrust seconde, is to take
with your arm in a perfect opposition to your adversary's, hold-
ing your head inside: to thrust tierce, differs from carte only
by the position of the hand, which must be reversed.

TRHUSTING, or Hand-preasing, in Dairying, is a term
applied to the practice of squeezing and forcing the liquid
parts contained in the cud out of it by the hand, or
other such means, after it has been properly reduced,
and placed by a cloth in an unheaped or conical manner in the
vat or hoop.

TRHUSTING-Screws, in Rural Economy, a contrivance of
the large screw kind, calculated for affording due pre-
fure in the making of cheefe with facility and con-
venience. These screws are perfectly simple, and capable
of being made either of wood or iron; but the latter mate-
rial is probably by much the best. They may be wrought
in several different ways, but it is commonly done by means
of a fort of lever applied in some manner or other, not un-
usually through a hole for the purpose in the head of the
large screw. In some districts they have them fixed up
in the under-fides of the floors above the preffing-rooms, and
the power of them is managed as to be regulated at plea-
ure. By means of these thrusting-screws, it is evident that
the preflure can be gradually increafed, as there may be
occasion, from the blind application to the concluding hard
or heavy preflure infinishing the work. This command of
power is, of course, a circumstance of great utility and
advantage in such businesss.

TRHUSTINGS, a term applied in cheefe-making, in
some districts, to the white whey, or that which is the last
preffed or forced out of the curd by the hand and other
means, after it has been put into the cheefe vat. In some
influences in the process and practice of making butter
of the whey kind, these thrustings are fet by in earthen pans
for the purpose, in order to acidulgate, or carrve, as it is
called in some places, either by means of the warmth of the
featon, or of a room, for being churned, in the same way
as in the common manner practiced, in many places, for
making butter from milk. See WHEY.

These thrustings, probably, form and constitute the best
butter of the whey fort, though it is made from that fluid
managed in other ways, as seen under the head just referred
to above.

TRHYALLIS, in Botany, an ancient Greek name for soma-
thing of the Mullein kind, whose woolly leaves served
to make wicks for lamps. It is not easy to conceive how Linnaeus came to apply this name here, nor can we trace out any thing to account for his having done so. We must readily agree with De Theis, that the shrub, about to be described has nothing in common with *Verbena*, but its yellow flowers. (See Dioscorides, book 4. chap. 104.)—Linn. Gen. 213. Schreb. 289. Willd. Sp. Pl. v. 2. 570.


Gen. Ch. Cal. Perianth inferior, in five deep, lancelolate, erect, permanent segments. Cor. Petals five, roundifh, spreading. Stem. Filaments ten, awl-shaped, longer than the calyx; anthers roundifh. *Pill.* German obtuse; style thread-shaped, the length of the flavescent; stigma simple. Peric. Capsule with three fides, and three angles, obtuse, separable into three parts; its cells burfting at the external angle. Seeds solitary, very smooth, obovate; obtufe at the bafe, with an incurved point.

1. *Th. brasiliensis*. Brasilian Thryallis. Linn. Sp. Pl. 554. Willd. n. 1. (Fruiticeens herba; Marcgr. Bral. 79. f. 3.)—Native of Brazil. A little *brufb*, with round, jointed, reddifh branches. Leaves on reddifh footstalks, oppofite, ovate, entire, about an inch long; pale green above; whiffifh beneath, with a flender mid-rib. *Sipularis* briffle-shaped. Clifiers terminal, solitary, from fix or seven inches to a foot long, with very flender partial flakes, longer than the flowers, and very short fetteaceous briffes. Flowers small, elegant, yellow, bordered with red, with which colour also their yellow flavescent are fpneckled. Fruit three-lobed. Neither the plant nor its flower has any remarkable odour. Linnaeus apparent to have examined a dry fpecimen of this plant, but it is wanting in his herbarium, as well as in every other that we have been. His idea of its natural order is furely lefs correct than fuffiieu's. Specimens without fruit are not unlikely to have been overlookd for some nondefcript *Bamifleria* or *Malpigia*.


**THRYOCEPHALUM**, in *Botany*, a genus of Forfter's, named from *brufb*, a fort of *ryb*, and *skepia*, a head, because of the habit of the plant, and its little round head of flowers. This genus is the fame as *Kyllingia*. (See that article.) The only species mentioned by Forfter is that ferened by us as *K. monoecephala*. Vahl, in his *Enum. Plant.* v. 2. 381, refers it to *K. triepis*, probabiy because he faw a fpecimen with a compound head. This very circumftance strengthens his own fpuficion, that thefe two fpoked species of *Kyllingia* are not, in reality, diftinct. Our fpecimen from Forfter himfelf has a very flight indication of a small lateral head, by the fide of the principal one, nor can it be otherwife diftinguifhend from *K. monoecephala*. In the ftucture or appearance of any other part, we cannot difcern the leaf diference between *monoecephala* and *tripis*, in separating which we confidered more in thofe who have originally defcribed thefe plants, than it seems they deferved.

**THRYOESSA**, or *Thryon*, in *Ancient Geography*, called from the time of Strabo Epitafium, fitted on the left banks of the Alpheus, E. of Olympia.


Eff. Ch. Calyx-flumes of one valve, two-flowered, spiked, unilateral, on a dilated common flake; the lowermost ones only partly perfect; the reft male only; the inner flor of the lowermost glume male, its outer valve resembling the calyx. Nectary of two scales at the bafe of the germin. Stigmas feathery. Seed wrapped in the corolla, and enfolded in the hardened, clofed, involute flake.

The stems are creeping, very long, with erect, short, undivided, leafy branches. Spike solitary, terminal, short, for a long time half enclofed in a leaf-like fheathe. The common flake is thick and coriaceous, not membranous, as M. du Pet- *tit Thuars terms it, he having, as Mr. Brown supposes, confounded that part with the fheathe. Flowers feffile, in a fimple row, one or two of the lowest only being perfect, the remaining four, five, or fix, in the contracted portion of the spike, males.

Mr. Brown observes, that this genus of graffes is not very diftantly related to *Panicum* (fee that article); espe- cially to *P. dimidiatum*, Retz. Ohb. f. 23; but in *Tbarea*, the calyx-flumes are, with refpect to the flake, in- verted, and want an outer fvalue. In structure this genus agrees, in many particulars, with *Spinefix* (fee that artie- cle), in which the fexes are indeed more fpattered, and therefore a reuique abundance of males is provided. The figure and economy of the common-flake, or *racib*, too is different; though that part is permanent in both genera, and affifts in both, though not in the fame manner, to dif- perfe the fseeds.

The only fpecies of which we can give an account are the three following, though Mr. Brown mentions also a *T. fermentosof*.


'T. media. Br. n. 2.—"Perfect flowers folicitary. Leaves linear-lanceolate; their under fide fmothe, as well as the ftem."—Found by Mr. Brown, in the tropical part of New Holland.

'T. involuta. (Icshemum involutum; Forr. Prodr. 73. Willd. Sp. Pl. v. 4. 741.)—Perfect flowers folicitary. Leaves lanceolate, nearly fmothe on both fides.—Gathered by Forfter in the Society Ifles, and fome other places within the tropics. The fpecimen given by him to the younger Linnaeus is marked Tubicuf. The erect ftems, or branches, are but two or three inches high, fimple, fтратed, fmothe, each bearing at the bottom one lanceolate, acute, fтратed leaf, about its own length; feathing at the bafe; becoming involute in drying. Sometimes there is another leaf, about half as long, with a fheathe almost an inch in length, near the middle of the branch. Spike fcarcely an inch long, termi- nal, of about four flowers, springing laterally from the hollow of a concave pointed leaf, rather shorter than the reft. Calyx ribbed. Corolla fmothe. Feathery ftegmas very confpicuous in the lowermost flower.

**THUBUNA, TUBUNA**, in *Ancient Geography*, a town of Mauritania Sitifenis, according to Ptolemey; fitted in the mountains, between two rivers, S.W. of Igifili.

**THUBURSICA**, a town of Africa, in New Numidia.

**Ptol.**

**THUBUTIS**, a town of Africa Propria, near Bullaria.

**Ptol.**

**THUCCA**, or *Tucca*, *Dagga*, a town of the interior of Africa, mentioned by Ptolemey; fitted at the extremity of a small chain of hills about two miles S. of Tiburicum- bure. On this fte we were found many máufeulums, and the portico of a temple ornamented with beautiful column. Here was also an aqueduct.

**THUCYDIDES**, in *Biography*, a celebrated Greek his- torian, was born in the 77th Olympiad, about 470 B.C. The
The name of his father was Olorus, or Orclus, that of a Thracian prince, indicating a connection with Thrace, in which he seems to have possessed gold-mines, and to have had influence over its chiefs. He belonged to one of the principal families at Athens, and was related to that of Miltiades. His education was that which distinguished Athenians of rank: Anaxiphanes being his preceptor in rhetoric, and Anaxagoras in philosophy.

When he heard Herodotus recite his history at the Olympic festival, he is said to have cried tears; and Herodotus observing it, congratulated Olorus on his son's disposition. At the commencement of the Peloponnesian war he was at Athens, and shared in the calamity of pestilence that then occurred; and in the eighth year of that war he had a command in Thrace, and was opposed to the Spartan general Brasidas, who hurried the town of Amphipolis, for the loss of which Thucydid was punished by banishment, though it does not appear that he could have prevented it. During the twenty years of his exile, he devoted himself to literary researches and observations through different parts of Greece, and thus collected materials for the history which he was projecting. He refuted for a considerable time in Thrace, but the place and time of his death are not ascertained. Dodwell conjectures that he palled his 80th year, and died in Thrace. His history comprehends the transactions of the first twenty years of the Peloponnesian war, diffused in eight books; more limited in its compass than that of Herodotus, but not merely rivalling but surpassing it in historical merit, more especially if we admit that a modern writer says of it, 1 "that the first page of Thucydid is the commencement of real history." The distinguishing characteristics of this historian are diligence of research, and the selection of the best authorities, and perfect impartiality. To these qualities we may add facility in investigating causes and effects, and a philosophical spirit in forming a discriminating judgment of human affairs. His narration is occasionally very interesting, and indicates the writer of genius. His style, which has undergone much criticism, is of that kind which the ancients termed the aurea, aiming at force and brevity rather than harmony, elegance, or peripetia. Its conciseness and frequent transpositions render it frequently obscure, nor is this defect compensated by its energy and elevation. The most valued editions of this work are Hudson's, Oxon. 1696; Walf and Ducker's, Am. ed. 1731; and the Leipzig, 2 vols. 1790—1834. Volf. Hill. Greek. Gen. Biol.

THUDA, in Ancient Geography, a town of Africa, in Mauritania Cæfariana, near Tingis. Ptol.

THUELATH, a maritime town of Africa, on the coast of Libya, between Autolates and Thagana. Ptol.

THUEYE, in Geography, a town of France, in the department of the Ardèche; 18 miles W. of Privas.

THUJA, in Botany, 600: 600, or 600 of the Greeks, the name of a tree, whose very durable wood furred, according to Theophrastus, to make images. Its root in particular, being curiously twisted or veined, was used for the most valuable ornamental works. This plant was probably the Juniperus oxycedrus, very common throughout Greece and the Archipelago, of which Mr. Hawkins is of opinion that the most ancient statues were made. It is the Small Cedar, 40 to 500 of Diochorides, and still universally bears the name of Aro in modern Greek. Our present genus of Thuja has nothing in common with this classical plant, except being an aromatic evergreen tree, of the same natural order, with a very durable wood; but it is not a native of Greece or the Levant.—Linn. Gen. 500. Schreb. 651. Willd. Sp. Pl. v. 14. 508. Mart. Hill. Dict. v. 4. 321. Pursh 646. Juss. 413. Tourn. 1. 358. Lamark


Gen. Ch. Male. Cal. Catkin ovate, composed of a common flalk, on which the flowers stand opposite, in three rows, each flower having for its bace a nearly ovate, concave, obtuse scale. Cor. none. Stem. Filaments in each flower four, but scarcely visible; anthers as many, attached to the base of the scale above mentioned.

Female on the same plant, Cal. Catkin nearly ovate, with opposite flowers, and consisting of two-flowered, ovate, concave scales, converging longitudinally. Cor. none. Pist. German minute; style awl-shaped; stigma simple. Peric. Ovate-oblung, obtuse, beftribed, into oblong imbricated, nearly equal, obtuse, externally convex scales. Seeds solitary, oblong, each surrounded by a longitudinal membranous emarginate wing.


Female, Catkin becoming an imbricated cone, with two-flowered scales. Corolla none. Seed surrounded by a vertical membranous wing.

Obl. Linneus indicates the close relationship of this genus to Capestratus. They are neverthelefs distinguished by the peltate scales of the cone in the latter, and its angular, obtuse, scarcely winged, feel, or nats.

1. Th. occidentalis. American Arbor-vitæ. Linn. Sp. Pl. 1421. Willd. n. 1. Ait. n. 1. Pursh n. 1. "Michaux Arb. For. v. 3. 29. t. 5." (Arbor-vite; Cluf. Hilt. v. 1. 36. Gen. Em. 1366.)—Young branches twoweighted. Leaves imbricated in four rows, compressed, ovate, somewhat rhomboid, dotted. Inner scales of the cone abrupt, tumbid under the point.—Native of North America, from Canada to the mountains of Virginia and Carolina, blooming in May. It is rather scarce in the southern states, and only found on the steep banks of mountain torrents. The branches are extremely tough. Pursh. This tree was introduced into our gardens in Gerarde's time, or before, and is much esteemed for ornament and shelter in shrubberies, or for platted and clipped hedges in nursery-gardens, in which last itate it is really very beautiful. By a strange mistake of Linneus, this species is handed down as a native of Siberia; because Gmelin, Pl. Sib. v. 1. 182, mentions a Thuja, to which he misappplies the synonyms of the present, but which by his own account is different; for he says it is " paler than the garden kind, and smaller in all its parts." It was brought him by a travelling surgeon, from rocks near Pekin in China, and could be no other than the Ts. orientalis, hereafter described. Th. occidentalis is a perfectly evergreen tree, of humble growth, much branched, very different from most others in the compressed vertical aspect of its younger shoots, and their closely imbricated leaves, which are small, obtuse with a point, smooth; those of two opposite rows compressed and keeled; the intermediate ones flat, with a glandular point, or cell of resin, at the back. The flowers appear in May, and are small, solitary, terminal; the males yellowish, and moth abundant. Cones ripened the following year, drooping, each the size of a filbert-kernel, consisting of about half a dozen lax, smooth, coriaceous scales. The smell of the bunting plant is something like Savine, aromatic, but not agreeable. The wood is not hard, but tough and extremely durable, on which last account it is much esteemed in America for making pales and fences.

figures. Very bad.) — Young branches two-edged. Leaves imbricated in four rows, compressed, ovate, somewhat rhomboid, with a central furrow. Inner scales of the cone oblong, with a recurved dorsal point. — Native of rocky situations in China. Celmis. On mountains in Japan. Thunb. Jap. 266. A hardy tree in our gardens, which appears to have been cultivated by Miller in 1752. It flowers at the same time as the former, but though a much more handomc tree, is less common. The very copious and crowded young branches are more erect, more slender, and rather less compressed than the former, and the leaves are furrowed, without any refrinous dot. The differences between these two species are accurately marked in our specific characters, adopted from Linnaeus and Willdenow. The inner scales of the cone in that before us are remarkably hooked. Gartner observes that the wing of its seed is hardly discernible.

3. Th. articulata. Jointed Arbor-vite. Vahl. Symb. v. 2. 96 t. 48. Desfont. Atlant. v. 2. 353 t. 252. Willd. n. 3. (Th. aphylla; Linn. Sp. Pl. 1422, as to the synonym of Shaw, and part of the character taken from thence, but not of Am. Acad. v. 4. 295; see Tamarix. Cypessus fruticu quadrufilvi, folis equifeti infrac articulatis; Shaw Afric. n. 188 f. 188.) — Young branches jointed, rather compressed, with four furrows. Leaves minute, concave, pointed, four, at the top of each joint; glandular at the back. Cones quadrangular, of four hooked scales. — Native of the mountains of Barbary, where it is not uncommon. A tree from fifteen to thirty feet high, with round branches, the younger ones repeatedly subdivided, in a partly opposite, partly alternate manner, moderately compressed, composed of a series of linear, smooth, brittle joints, from a quarter to half an inch long, and marked with four longitudinal furrows, which are continued to the interstices of the four minute feal-like leaves crowning each of these joints. Willdenow, misled by the analogy of other species, and the figures of authors, supposes each joint to be an allomagne of leaves, from which error the faithful descriptions of Vahl and Desfontaines might have guarded him. Callins terminal, solitary; the males ovate-oblong, of many scales; females roundish, of much fewer. Fruit somewhat deflored, about the size of a black currant, with four protuberant angles, and crowned with many intermediate reflexed points. The scales separate at the angles, but are firmly united at their base. Seeds small, with a broad kidney-shaped wing. The late celebrated Broussonet observed the refus called Gum Sandaracze to be procured from this tree. Dole attributes it to the Common Juniper. Such being the history of the species before us, the Th. aphylla of Linnaeus becomes a nonentity.

4. Th. doabratia. Sculptured Arbor-vite. Linn. Suppl. 420. Willd. n. 4. Thunb. Jap. 266. (Quai, vulgar Fi no ki et hibuki; Kämpf. Am. 88.) — Young branches two-edged, jointed; convex on one side; concave and white on the other; joints oblongate. Leaves lateral, opposite, keeled, compressed. — Native of Japan. Thunberg observed it in the countries of Oygawa and Fakonia, between Minae and Jedo; and it was planted along the high road on the hill of Fakonia. He speaks of it as a tree of vast height and dimensions, the most beautiful of all the evergreen trees. The branches are alternate, repeatedly subdivided, compressed and clothed with imbricated leaves. At first sight the young branches appear covered with four rows of leaves, but the analogy of the foregoing species, even of the first of all, leads us to believe the intermediate row, on each side, is an obvolute furrowed joint, insensibly terminating in a short broad leaf, while the more obvious leaves are opposite, laterally inserted into the base of the joint at each side, and about the same length; each of them strongly compressed, with a thick keel, and incurved point. Their great peculiarity consists in being all convex and green on the upper side of the branch; concave and as if whitewashed, like the furrows of the joints, on the under. This gives the plant an artificial, but most elegant, appearance. The flowers we have not seen. Kämpfer says the fruitle is warty, the size of a pea.

5. Th. cupressoide. African Arbor-vite. Linn. Mant. 125. Willd. n. 5. Ait. n. 3. Thunb. Prodr. 110. (Th. aphylla; Burm. Prodr. 27, excluding the reference to Shaw.) — Young branches but slightly compressed. Leaves imbricated in four rows, even. Cones nearly globose, of four acute warty scales. — Native of the Cape of Good Hope, from whence Dr. Roxburgh introduced it to Kew Garden in 1799. The growth of the tree is tall and close, like that of the Cypress. Leaves closely imbricated, not spreading. Fruit of the size and appearance of the Cypress, nearly globular, with four oblique angles, separating into four thick acute valves or scales, tereulate externally, keeled within. Seeds numerous, each terminated by a membranous obvolute wing. Linnaeus adds to this description, "Ramuli minime articulati nec Equast." If minime be not printed by mistake for minimi, we presume this alludes to Shaw's synonym, cited in the "Manufact" with many scurfes, and certainly not belonging to this but to articulata, our third species.

THUJA, in Gardening, contains plants of the hardy, evergreen tree-kind, of which the species cultivated are, the American arbor-vite (T. occidentalis), and the Chinese arbor-vite (T. orientalis).

In the first of these species there are different varieties; as the American sweet-scented, and the variegated-leaved.

Method of Culture. — These plants may be increased by seeds, layers, and cuttings. Good seeds should be obtained from the native situations of the trees, and be sown soon after they are ripe, or as soon as they can be obtained, in autumn or spring, in pots or boxes of light earth, covering them half an inch deep, placing the pots, &c. in a sheltered warm situation, or under the shelter of a frame in bad weather, especially when sown in autumn, that they may be protected from severe frosts; they sometimes come up in the spring, but are frequently apt to remain in the ground till the second year. When the plants are come up, the pots should be placed in a cool border to have only the morning sun, but open to the free air, giving frequent but very moderate waterings all the summer; and in winter removing the pots again to a sheltered place till spring, when they may be pricked out in nursery-rows; or, when they are small and weakly, continued in the pots another year, placing them in a shady situation during summer, and in a sheltered place in winter; and in the spring following planting them out in the nursery, in rows a foot or two asunder, in order to acquire size and strength for planting out where they are to remain.

The layers should be made from the young shoots of one or two years growth, which may be laid down early in autumn, bending down the branches to the earth, and laying all the young wood in by slit or twist-laying, with the tops only appearing a little above ground; shortening any that have much longer tops than the others; they mostly emit roots in the earth, and form proper plants by the autumn following; when, or rather in spring after, they should be separated from the followers, and be planted in nursery-rows, to remain two or three years, or till of a proper size for the shrubbery, &c.

The cuttings should be made from the strong young shoots of the same year's growth, which should be planted in
in the autumn in a shady border, taking the opportunity of flowery weather, if possible, for the busy time; they should be cut off with a small part of the old wood, where practicable, and be planted in rows a foot asunder, closing the earth well about them: they will be properly rooted in one year for planting out in wider nursery-rows: they may also be planted in pots, and placed in a hot-bed, in order to have them more forward.

And they all may be planted out into the borders, &c. in the autumn or early spring months.

These trees in their native situations grow to very considerable sizes and magnitudes, but in this climate they are of much inferior growths, seldom rising to any great height or thickness. They succeed best in the countries from which they are brought, in rather moist soils; but here they thrive perfectly in any tolerably good common kind, and in any situation. They have a beautiful form of growth, being much and finely branched from their very bottoms, and constantly closely adorned with leaves, which are of a very minute fize, and arranged in a curiously compact imbricated manner, displaying a continual verdure and ornamental variety at all times of the year.

They are highly ornamental evergreens, proper for adorning the shrubbery and other parts, having a fine effect also when disposed finely in borders, &c. and in open spaces of grounds; in all of which situations they should be tuffered to grow with their full branches, in their own natural way, except reducing with a knife: any low straggling or rambling branches occasionally: this is all the culture they require afterwards.

They may also be employed as timber-trees, in the evergreen forest-tree plantations.

And those in the pots, as the Chineese arobor-vitae, may be placed among other potted plants to adorn any particular compartment, and in allembage with greenhouse plants for variety.

THUILLIER, VINCENT, in Biography, a learned Benedictine, was born at Concy, in the diocese of Laon, in 1658; and entered into the congregation of St. Maur in 1723, where he was distinguished for his talents. Having officiated as professor of philosophy and theology in the abbey of St. Germain-des-Pres, he was made Sub-prior, and died in 1736. With his extensive literature, he combined a lively imagination and a turn for fancy, which involved him in several controversies. He first opposed, and then warmly defended the bull "Unigenitus," on which subject he published two treatises. But he was more usefully employed in a French translation of Polybius, which appeared in 1724–28, in 6 vols. 4to. His version is elegant and faithful. Moren.

THUIN, in Geography, a town of France, in the department of Jemappes, on the Sambre; 14 miles S.E. of Mons. N. lat. 50° 20'. E. long. 4° 21'.

THUIR, a town of France, in the department of the Laved Pyrenees; 7 miles S.W. of Perpignan.

THULDEN, THOMAS VAN, in Biography, was one of the most distinguished among the pupils of Rubens, whom he assisted in forwarding the pictures of the Lussembourg gallery. He was born at Bois-le-Duc in 1607. He painted a considerable number of large works for the churches and public buildings of the principal towns and cities in Flanders; some of which have been honoured by being considered as from the hand of Rubens. Among the best of them are the Martyrdom of St. Sebastian, at Mechlin; the Martyrdom of St. Adrian, at Ghent, and the Assumption of the Virgin, formerly in the church of the Jesuists, at Bruges. He was engaged at Paris, which he visited in 1633, to paint a series of pictures of the life of the patron saint of the Mathurins, St. John of Matha, which he afterwards etched and published in twenty-four plates. He is also the author of several other etchings from his own works and those of others; particularly of 58 plates of the life of Ulysses, from pictures painted at Fontainebleau by Primaticcio, of most of which there is now no other remembrance but his etchings. He died in 1676, at the age of 69.

THULE, or Thyle, in Ancient Geography, an island of the Northern ocean, described in a very vague manner by the ancients; but which some maintain to have been the Shetland islands. Virgil (Georg. l. i. v. 30.) and Seneque (Medea, v. 379.) call this island "Ultima Thule." It is difficult to ascertain its precise situation. Strabo ascribes the ignorance and uncertainty that prevailed with regard to this island to its great distance, and charges Pytheas with having made many false reports concerning it. Ptolemy places the middle of this island in 63° of latitude, and says, that at the time of the equinoxes, the days were 24 hours, which could not have been true at the equinoxes, but must have referred to the solstices; and, therefore, this island is supposed to have been in 66° 30' lat. or under the polar circle. Stephanus Byzantinus says of this island, "Thula insula magna in oceano sub Hyperboreas partes ubi Aeolus dies ex vigenti horis aequalibus conlat, no vero ex quattuor. Hybernae vero dies e contrario." From this account it appears that the ancients described an island which was situated three degrees on this side of the polar circle; but its situation, if such an island existed, still remained very uncertain. As the ancients have not given us the dimensions of this island, some authors have concluded that the appellation of Thule was given to Scandinavia, of which the ancients had a very imperfect knowledge.

According to Procopius (l. iii. de Bell. Goth. c. 14) a party of the Eutulians, when vanquished by the Lombards, fought an abode towards the extremities of the earth. With this view they traversed the country of the Scelavians; and in their progress entered into the country of the Varbri, and into Denmark, and at length arrived on the ocean, where they embarked, and then landed on the island of Thule. This island, he adds, is ten times larger than Great Britain, and is far remote from the northern coast, a great part of it being desert. The habitable part was occupied by thirteen distinct classes of people, who had their respective kings. Towards the summer solstice, the sun appeared 40 days successively above their horizon; six months afterwards, the inhabitants had 40 days of night, which they passed in a state that was truly deplorable, as their commerce was totally interrupted. By the account of Procopius, it appears that the place to which he refers must have been beyond the polar circle, and of course beyond 63° lat., where Ptolemy placed the middle of Thule. Procopius says, that he wished to visit this island, but was never able to accomplish his object; but he professes to have derived his information from persons who had actually visited the country, and he describes its aspects, productions, and the manners of its inhabitants. His details correspond to the accounts that have been given of the ancient state of Lapland (which see); but this could not have been the Thule of the ancients. The descriptions transmitted to us from the ancients of their pretended isle of Thule are so intermixed with fabulous and incredible relations, that some modern geographers have even doubted whether such an island as they describe ever existed; others have supposed that they refer to Scandinavia, or some country far distant to the north, of which we could have
no certain and satisfactory accounts; and others again have been of opinion, that no island to which modern voyagers have had access, correspond more exactly to their reports than the islands of Shetland, N. of Scotland. See _Zeland Islands_.

**Thule,** in Geography, a town of Westphalia, in the bishopric of Paderborn; 6 miles W.S.W. of Paderborn.

**Thule,** a river of Wales, in the county of Glamorgan, which runs into the Llhogor, near its mouth.

**Thule, Southern,** a part of Sandwich Land, observed by Capt. Cook in January 1775, in S. lat. 59° 13' 30" and W. long. 27° 45'; and so called because it is the most southern land that has ever yet been discovered. It exhibits a surface of vast height, and is everywhere covered with snow. Some thought that they saw land in the space between Thule and Cape Brito: Cook thought it more than probable that the two lands are connected, and that this space is a deep bay, which he called Forster's bay.

**Thum,** a town of Saxony, in the circle of Erzgebirg; 7 miles S. of Chemnitz. N. lat. 50° 37'. E. long. 12° 50'.—Allo, a town of Bavaria, in the bishopric of Bamberg; 3 miles S.S.W. of Forchheim.

**Thumata,** in Ancient Geography, a town of the Arabs, placed by Pliny on the banks of the Tigris, at a considerable distance from the town of Petra.

**Thumatha,** a town situated in the interior of Arabia Felix, between Chabata and Opalstat. Ptol.

**Thumb, Politex,** in Anatomy, one of the members or parts of the hand. See Extremities.

**Thum-Stall,** a ferrule made of iron, horn, or leather, with the edges turned up, to receive the thread in making falls. It is worn on the thumb to tighten the stitches while sewing.

**Thumelitha,** in Ancient Geography, a town of Africa, in Interior Libya, near the source of the river Cydnus. Ptol.

**Thumereville,** in Geography, a town of France, in the department of the Mofelle; 6 miles S.W. of Brie.

**Thumerstone,** in Mineralogy; Asinite, Haity. This mineral was called Thumerstone by Werner, from Thum, in Saxony, the place where it was found; and Asinite by Haity, from the flattened sharp edges of the crystals resembling the edge of an axe. This is the first character which strikes the eye when this mineral is presented for inspection. It is most commonly found crystallized, but sometimes massive or disseminated. The form of the crystals is very compressed oblique rhombohedral prism. The primitive crystal, according to Haity, is a four-sided prism, whole bales are parallelograms with very oblique angles: the larger angle being 101° 32', and the smaller 78° 28'. In the secondary crystals, the acute edges are generally truncated. It is crystallized also in oblique four-sided tables. The form of the crystals is sometimes very difficult to be determined; they not infrequently intersect one another, forming a cellular aggregation. The external luster is generally splendent; internally it is glintening or shining, and is vitreous. It is transparent or translucent. The fracture is fine-grained and uneven; in the translucent varieties, it sometimes approaches to splinterly; and in the transparent varieties, to the small and imperfectly conoidal. It scratches glass; is harder than felspar, but not so hard as quartz; it is fragile, and fusible by the blow-pipe into a greenish-white glass, but if laid on charcoal into a black glass. The specific gravity is from 3.2 to 3.3. The colours of this mineral are most commonly a close-brown of various degrees of intensity, inclining to violet and green.

Vol. XXXV.

It is sometimes green and opaque: according to Brongniart, this is owing to a mixture of chlorite. It has been observed, he remarks, that the crystals which are coloured with this earth are the most regular. The constituent parts are given by Klaproth and Vauqueul as under.

<table>
<thead>
<tr>
<th>Mineral</th>
<th>Klaproth</th>
<th>Vauquelin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silex</td>
<td>52.70</td>
<td>50.50</td>
</tr>
<tr>
<td>Alumine</td>
<td>25.79</td>
<td>16.00</td>
</tr>
<tr>
<td>Lime</td>
<td>9.39</td>
<td>17.00</td>
</tr>
<tr>
<td>Oxyd of iron</td>
<td>8.63</td>
<td>9.50</td>
</tr>
<tr>
<td>Oxyd of manganese</td>
<td>5.25</td>
<td>4.00</td>
</tr>
<tr>
<td>Potash</td>
<td>0.25</td>
<td></td>
</tr>
</tbody>
</table>

This mineral occurs in Saxony, France, Switzerland, and Spain, and at mount Atlas, in Africa. It is found also massive and crystallized near St. Juft, in Cornwall, at the Bodelch mine, associated with common garnet, and in veins between Marazion and Penzance.

The most beautiful variety is met with in a rock of serpentine, near Balme d'Auris, in Dauphiny, in the department of the Isere, where it generally occurs in well-defined crystals, sometimes colourless and transparent, but more frequently of a dull reddish-violet colour, whence it obtained the name of violet schoorl of Dauphiny. The crystals of thumerstone, which are not symmetrical, become electric by heat; it is indeed a general law, that all minerals which possest the pyro-electric property, are defective in the symmetry of the crystals.

**Thumilitz,** in Geography, a river of Saxony, which runs into the Mulda; 3 miles S. of Grina.

**Thumim,** in the Scripture Learning. See Urim and Thummim.

**Thumna,** in Ancient Geography, the name of two towns situated in the interior of Arabia Felix; one between Mochura and Aluare, and another between Mariama and Vodona. Ptol.

**Thun,** in Geography, a town of Switzerland, in the canton of Bern, at the distance of about 12 miles from the town of Bern. It occupies the bottom and brow of a hill, and stretches on both sides of the Aar. It contains 1200 inhabitants, enjoys considerable immunities, has its own magistrates and courts of justice, in which the bailiff from Bern always presides, and from whose decision an appeal always lies to the capital. The inhabitants employ themselves in carding and spinning silk for the manufactures of Basle. Some of the burghers possess large herds of cattle. To the N.E., on an eminence, stands the church, and the castle, which is the residence of the bailiff. N. lat. 46° 44'. E. long. 7° 31'.—Allo, a lake of Switzerland, in the canton of Bern; about four leagues long, and one broad, and probably very deep: the borders are richly variegated, and present several fine points of view, much heightened by many rugged rocks rising boldly from the margin of the water. The river Aar passes through the lake of Brienz, and then enters that of Thun, from which it is again discharged, passing between two level promontories, prettily sprinkled with trees, on one of which stands the castle of Schadow; 15 miles S.S.E. of Bern.

**Thuna,** a town of Cachemire; 45 miles S. of Ca-chemire.

**Thunbergia,** in Botany, received that name first from Professor Retzius, and next in the Supplementum Plantarum, from the pen of the younger Linnaeus, in honour of their mutual friend, Sir Charles Peter Thunberg, knight of the order of Wafa, by whose discoveries that work was peculiarly enriched with new and curious species, especially from the Cape of Good Hope. This illustrious veteran still
fits in the prefforial chair of Rudbeck and Linnaeus at Upfal, after having essentially added to the general rock of knowledge by his Travels to Japan, his Flora of that country, and of the Cape, and his very numerous academical communications. The liberal communications, and amiable character of professor Thunberg, have secured him no less personal esteem than his extensive application and knowledge.


Gen. Ch. Cal. Perianth inferior, double, permanent: the outermost of two ovate, obtuse, ribbed, equal leaves, as long as the tube of the corolla: inner of one leaf, in many, about twelve, awl-shaped erect segments, not one-third so long as the former. Cor. of one petal, falver-shaped: tube gradually dilated upwards: limb in five deep, nearly equal, ovate, very abrupt segments, about half the length of the tube. Stam. Filaments four, awl-shaped, inserted into the tube, the two lower ones shorter, all included within the tube; anthers arrow-shaped. Pfl. German superior, roundish; style thread-shaped, crept, hardly so long as the tube; stigma of two rounded flat lobes. Peric. Capsule globose with a beak, smooth, or two cells and two valves, burting lengthwise: the beak linear, obtuse, compressed, furrowed; partition ovate, margined, perforated below the summit, membranous at the sides, permanent. Seeds two in each cell, kidney-shaped, rugose, convex on the outside, concave on the inner, with a longitudinal furrow.


Obf. Linnaeus remarks that this genus agrees in many points with Barleria. Thunberg takes the outer calyx-leaves for bracteas, but this is not countenanced by the altogether peculiar appearance of the inner calyx, by no means like an external perianth.

1. T. capensis. Diffuse Thunbergia. Linn. Suppl. 292. Willd. n. 1. Retz. Act. Lund. v. i. 163, with a figure.—Leaves roundish-ovate, obtuse. Stem diffuse.—Native of the Cape of Good Hope. The root seems to be perennial. Stems a finger's length, diffuse, simple, leafy, square, hairy. Leaves opposite, on short hairy stalks, entire or somewhat toothed, hardly an inch long, strongly reticulated with veins: very rough with minute bristles above; hairy beneath. Flowers yellow, on simple, foliary, fistulated, crept, axillary, hairy stalks, twice the length of the leaves. Outer calyx very hairy; inner rigid, with almost pungent points. Corolla about an inch long, its segments somewhat rounded. Capsule rigid, about the same length.

2. T. fragrans. Twining Thunbergia. Roxb. Corom. v. i. 47. t. 67. Willd. n. 2. Ait. Repof. t. 123.—Leaves ovate-oblong, somewhat heart-shaped, acute. Stem twining.—Common in hedges among bushes, on the banks of water-courses, about Simulæth. flowering in the wet and cold seafsons. Dr. Roxburgh never met with it any where else. He says the plant produces a peculiar and agreeable fragrance, and the beauty of its flowers, though not fragrant, entitles it to a place in the flower-garden. No scent has been discovered in any part of this plant in our flowers, where it blossoms freely all summer long. The long

and twining stems readily distinguish this species from the foregoing, as well as the elongated form of the leaves, which are occasionally angular, or toothed, near the base. The flowers are white, larger, and with a narrower tube than the caperina, their segments more abrupt or somewhat notched.

It appears by the Linnean herbarium that the younger Linneus had originally defined the name of Solandra for this genus.

Another Thunbergia was previously established by Dr. Montin, in the Stockholm Transactions for 1773, but the noble plant on which it was founded proved a Gardenia. See that article.

THUNDER, a noise in the lowest region of the air, excited by a sudden explosion of electrical clouds; which, on this account, are called thunder-clouds.

Senea, Rohault, and other authors, both ancient and modern, account for thunder by supposing two clouds impeding over one another, the upper and rarer of which, becoming condensed by a fresh accession of air raised thither by warmth from the lower parts of the atmosphere, or driven upon it by the wind, immediately falls forcibly down upon the lower and denser cloud: by which fall the air interpolated between the two being compressed, that next the extremities of the two clouds is liquefied out, and leaves room for the extremity of the upper cloud to close tight upon the under; thus a great quantity of air is enclosed, which, at length escaping through some winding irregular vent or passage, occasions that noise which we call thunder.

But this could only reach to the phenomena of thunder heard without lightning; and, therefore, recourse has been had to another solution. It has been said, that thunder is not occasioned by the falling of clouds, but by the kindling of fulphurous exhalations, in the same manner as the noise of aurum fulminans.

"There are fulphurous exhalations," says Sir Isaac Newton, "always ascending into the air when the earth is dry; there they ferment with the nitrous acids, and sometimes taking fire, generate thunder, lightning, &c."

That, besides the vapours raised from water, &c. there are also exhalations carried off from sulphur, bitumen, volatile salts, &c. is past all doubt; the salt quantity of fulphurous and bituminous matter all over the surface of the earth, and the volatile salts of plants and animals, afford such an ample flock of them, that it is no wonder the air should be filled with such particles, raised higher or lower, according to their greater or less degree of subtility and activity; and more copiously spread in this or that quarter, according to the direction of the winds.

Now, the effects of thunder are so like those of fired gunpowder, that Dr. Wallis thinks we need not feruple to ascribe them to the same cause; and the principal ingredients in gunpowder, we know, are nitre and sulphur; charcoal only serving to keep the parts separate, for their better kindling.

Hence, if we conceive in the air a convenient mixture of nitrous and fulphurous particles, from the sources above mentioned; and those, by any cause, to be set on fire, such explosion may well follow; and with such noise and light, the two phenomena of thunder, as in the firing of gunpowder; and being once kindled, it will run from place to place, this way or that, as the exhalations happen to lead it; much as is found in a train of gunpowder.

This explosion, if high in the air, and remote from us, will do no mischief; but if near us, may destroy trees, animals, &c. as gunpowder would do in the like circumstances.

This nearness, or distance, may be estimated by the in-
terval of time between the flash and the noise. Dr. Wallis observes, that, ordinarily, the difference between the two is about seven seconds, which, at the rate of 1142 feet in a second of time, gives the distance about a mile and a half; but sometimes it comes in a second or two, which argues the explosion very near us, and even among us. And in such cases, the doctor affuises us, he has more than once foretold the mischief that happened.

Upon the whole, that there is in lightning a sulphurous vapour has been argued from the finell of sulphur which attains it, and from the fultry heat in the air which immediately precedes it; and that there is a nitrous vapour along with it, the same writer concludes hence, that we know of no other body so liable to a sudden and violent explosion. And as to the kindling of these materials, we know that a mixture of sulphur and steel-findings, with a little water, will of itself break forth into actual flame. Nothing, therefore, is wanting to the explosion but some chalybeate or vitriolic vapour; and, among the various effusions from the earth, the doctor does not doubt but there must be some of that kind; but, in proof of what he leaves as a probability, the following facts are alleged.

In history, we meet with instances of its raining iron in Italy, and iron-rains in Germany. Jul. Scaliger tells us, he had by him a piece of iron rained in Savoy, Cardan reports 1200 iron to have fallen from heaven, some of them weighing 30, some 40, and one 120 pounds, all very hard, and of the colour of iron.

The matter of fact is so well attested, that Dr. Lifter, in the Philosophical Transactions, builds a whole theory of thunder and lightning on it; maintaining that they both owe their matter to the vapour or exhalation of the pyrites.

The noise of thunder, and the flame of lightning, are easily made by art. If a mixture of oil or spirt of vitriol be made with water, and some filings of steel added to it, there will immediately arise a thick smoke or vapour out of the mouth of the vessel; and if a lighted candle be applied to this, it will take fire, and the flame immediately descend into the vessel, and this will be burst to pieces with a noise like that of a cannon.

This is so far analogous to thunder and lightning, that a great explosion and fire are occasioned by it; but in this they differ, that this matter when once fired is destroyed, and can give no more explosions; whereas, in the heavens, one clap of thunder usually follows another, and there is a continued succession of them for a long time. M. Hornberg explained this by the lightnings of the air above us in comparison of that here, which therefore would not suffer all the matter so kindled to be dissipated at once, but kept it for several returns.

Ever since the year 1732, in which the identity of the matter of lightning, and of the electric fluid, has been ascertained, philosophers have generally agreed in considering thunder as a concussion produced in the air by an electrical explosion. For the illustration and proof of this theory, see Lightning. See also Electricity. We shall here observe, that Mr. Henry Eales, in a letter written in 1751, and read before the Royal Society in 1752, considers the electrical fire as the cause of thunder, and endeavours to account for it on this hypothesis; and he tells us, that he did not know of any person having made the same conjecture. Phil. Trans. vol. xlvii. p. 524, &c.

That rattling in the noise of thunder, which makes it seem as if it passed through arches, or were broken variously, is probably owing to the sound being excited among clouds hanging over one another, and the agitated air passing irregularly between them.

See this phenomenon particularly accounted for under Lightning.

**Thunder-Bolt.** If what we call lightning acts with extraordinary violence, and breaks or shuts any thing, it is called a thunderbolt, which the vulgar, to fit it for such effects, supposeth to be a hard body, and even a stone.

But that we need not to have recourse to a hard solid body to account for the effects commonly attributed to the thunderbolt, will be evident to any one, who considers those of the pulvis fulminans, and of gunpowder; but more especially the aulofulminating powers of electricity, even when collected and employed by human art, and much more when directed and exercised in the course of nature.

When we consider the known effects of electrical explosions, and those produced by lightning, we shall be at no loss to account for the extraordinary operation vulgarly ascribed to thunderbolts. As stones and bricks struck by lightning are often found in a vitrified state, we may reasonably suppose, with Ignior Boccac 1s, that some stones in the earth, having been struck in this manner, first gave occasion to the vulgar opinion of the thunderbolt.

Placed struck with thunderbolts were held sacred among the ancients. Nigidius has a curious treatise on the thunderbolt.

The ancient painters and poets have armed Jupiter with a fort of flaming dart, called a thunderbolt. Thus, it is said, he became master both of gods and men.

These thunderbolts are forged for Jupiter, according to the poets, by the Cyclops.

The thunderbolt, in antiquity, represented sovereignty, and a power equal to the gods; on this account, Apelles painted Alexander, in the temple of Diana of Ephesus, holding a thunderbolt in his hand; and on medals, the thunderbolt is sometimes found to accompany the emperor's head, as that of Augustus.

Appian informs us, that the thunderbolt was the principal divinity of Seleucia; adding, that it was adored, even in his time, with various hymns and ceremonies.

**Thunder-Clouds,** in Physiology, are those clouds which are in a state fit for producing lightning and thunder. From Ignior Baccar's exact and circumstantial account of the external appearances of thunder-clouds, we shall extract the following particulars.

The first appearance of a thunder-cloud, (which generally happens when there is little or no wind,) is one dense cloud, or more, increasing very fast in size, and rising into the higher regions of the air. The lower surface is black, and nearly level; but the upper finely arched, and well defined. Many of these clouds often seem piled upon one another, all arched in the same manner; but they keep continually uniting, swelling, and extending their arches.

At the time of the rising of this cloud, the atmosphere is generally full of a great number of separate clouds, motionless, and of odd and whimsical shapes. All these, upon the appearance of the thunder-cloud, draw towards it, and become more uniform in their shapes as they approach, till, coming very near the thunder-cloud, their limbs mutually stretch towards one another; they immediately coalesce, and together make one uniform mass. These he calls **adscriptious** clouds, from their coming in, to enlarge the size of the thunder-cloud.

But sometimes the thunder-cloud will swell, and increase very fast, without the conjunction of any adscriptious clouds; the vapours in the atmosphere forming themselves into clouds wherever
which interrupted.

When the thunder-cloud is grown to a great size, its lower surface is often ragged, particular parts being detached towards the earth, but still connected with the rest. Sometimes the lower surface swells into various large protuberances, bending uniformly toward the earth. And sometimes one whole side of the cloud will have an inclination to the earth, and the extremity of it will nearly touch the earth. When the eye is under the thunder-cloud, after it is grown larger, and well formed, it is seen to sink lower, and to darken prodigiously; at the same time that a number of small addititious clouds (the origin of which can never be perceived) are seen in a rapid motion, driving along in very uncertain directions under it. While these clouds are agitated with the more rapid motions, the rain generally falls in the greatest plenty, and if the agitation be exceedingly great, it commonly hails.

While the thunder-cloud is swelling, and extending its branches over a large tract of country, the lightning is seen to dart from one part of it to another, and often to illuminate its whole mass. When the cloud has acquired a sufficient extent, the lightning strikes between the cloud, and the earth, in two opposite places, the path of the lightning lying through the whole body of the cloud and its branches. The longer this lightning continues, the rarer does the cloud grow, and the less dark is its appearance; till, at length, it breaks in different places, and flews a clear sky. When the thunder-cloud is thus dispersed, those parts which occupy the upper regions of the atmosphere are equally spread, and very thin; and those that are underneath are black, but thin too; and they vanish gradually, without being driven away by any wind.

These thunder-clouds were sometimes in a positive as well as negative state of electricity. The electricity continued longer of the same kind, in proportion as the thunder-cloud was simple and uniform in its direction; but when the lightning changed its place, there commonly happened a change in the electricity of the apparatus over which the clouds passed. It would change suddenly after a very violent flash of lightning, but the change would be gradual when the lightning was moderate, and the progress of the thunder-cloud slow. Beccar. Lettore dell’Elettrificus, p. 177; or Priestley’s Hist. Elecr. vol. i. p. 397, &c. See Lightning.

Thunder-House, in Electricity, is an instrument invented by Dr. James Lind of Edinburgh, for illustrating the manner by which buildings receive damage from lightning, and to evince the utility of metallic conductors in preserving them from it.

A (Plate XV. Electricity, fig. 2) is a board about three quarters of an inch thick, and shaped like the gable-end of a house. This board is fixed perpendicularly upon the bottom board B, upon which the perpendicular glass pillar C D is also fixed in a hole about eight inches distant from the basis of the board A. A square hole I LM K, about a quarter of an inch deep, and nearly an inch wide, is made in the board A, and is filled with a square piece of wood, nearly of the same dimensions. It is nearly of the same dimensions, because it must go so easily into the hole, that it may drop off, by the leaf-flanking of the instrument. A wire, L K, is fastened diagonally to this square piece of wood. Another wire, I H, of the same thickness, having a brass ball, H, screwed on its pointed extremity, is fastened upon the board A: so also is the wire MN, which is shaped in a ring at O. From the upper extremity of the glass pillar C D, a crooked wire proceeds, having a spring socket F, through which a double knobbed wire slips perpendicularly, the lower knob, G, of which falls just above the knob H. The glass pillar D C must not be made very flat into the bottom board; but it must be fixed so that it may be pretty easily moved round its own axis, by which means the brass ball G may be brought nearer or farther from the ball H, without touching the part E F G. Now when the square piece of wood I M K (which may represent the shudder of a window or the like) is fixed into the hole so that the wire L K stands in the dotted representation I M, then the metallic communication from H to O is complete, and the instrument represents a house furnished with a proper metallic conductor; but if the square piece of wood I M K is fixed so that the wire L K stands in the direction L K, as represented in the figure, then the metallic conductor H O, from the top of the house to its bottom, is interrupted at I M, in which case the house is not properly secured.

Fix the piece of wood L M K so that its wire may be as represented in the figure, in which case the metallic conductor H O is discontinued. Let the ball G be fixed at about half an inch perpendicular distante from the ball H, then, by turning the glass pillar D C, remove the former ball from the latter; by a wire or chain connect the wire E F with the wire Q of the jar P, and let another wire or chain, fastened to the hook O, touch the outside coating of the jar. Connect the wire Q with the prime conductor, and charge the jar; then, by turning the glass pillar D C, let the ball G come gradually near the ball H, and when they are arrived sufficiently near one another, you will observe, that the jar explodes, and the piece of wood L M K is pushed out of the hole to a considerable distance from the thunder-house. Now the ball G, in this experiment, represents an electrified cloud, which, when it is arrived sufficiently near the top of the house A, the electricity strikes it, and as this house is not secured with a proper conductor, the explosion breaks part or it, i.e. knocks off the piece of wood I M.

Repeat the experiment with only this variation, viz. that this piece of wood I M is situated so that the wire L K may stand in the situation I M; in which case the conductor H O is not discontinued; and you will observe that the explosion will have no effect upon the piece of wood L M, this remaining in the hole unmoved; which shews the usefulness of the metallic conductor.

Farther, unfcrew the brass ball H from the wire H I, so that this may remain pointed, and with this difference only in the apparatus repeat both of the above experiments, and you will find that the piece of wood I M is in neither case moved from its place, nor any explosion will be heard, which not only demonstrate the preference of conductors with pointed terminations to those with blunted ones, but also shews that a house furnished with sharp terminations, although not furnished with a regular conductor, is also sufficiently guarded against the effects of lightning.

Mr. Henly, having connected a jar containing 509 square inches of coated surface with his prime conductor, observed that if it wasfo charged as to raise the index of his electrometer to 60°, by bringing the ball on the wire of the thunder-house, to the distance of half an inch from that connected with the prime conductor, the jar would be discharged, and the piece in the thunder-house thrown out to a considerable distance. Using a pointed wire for a conductor to the thunder-house, instead of the knob, the charge being the...
fame as before, the jar was discharged silently, though sud-
denly; and the piece was not thrown out of the thunder-
house. In another experiment having made a double circuit
to the thunder-house, the first by the knob, the second by
a sharp-pointed wire, at one and one-fourth of an inch di-
tance from each other, but of exactly the same height (as in
fig. 3) the charge being the same; although the knob was
brought first under that connected with the prime conductor,
which was raised half an inch above it, and followed by the
point, yet no explosion could fall upon the knob; the point
drew off the whole charge silently, and the piece in the
thunder-house remained unmoved. Phil. Trans. vol. liv.
part i. p. 136. See Points, in Electricity.

 Thunder-Stone, in Natural History, the same with that
called by authors brontia.

 Thunder-Storm. See Thunder-Clouds.

 Thunder Bay, in Geography, a bay in lake Huron,
about nine miles long, and nearly as many broad. The
Indians who reside near, and all European travellers who
have passed this bay, agree to call it by the present name, on
account of the continual thunder they observe. N. lat. 44°
50'. W. long. 83° 30'.—Also, a bay on the N. part of
lake Superior.

 Thundering Legion, Legio Fulminans, was a
legion in the Roman army, consisting of Christian soldiers,
who in the expedition of the emperor Marcus Aurelius An-
toninus against the Sarmatæ, Quadri, and Marcomanni,
A.D. 174, are said to have faved the whole army, then
ready to perish with thirst, by procuring, with their prayers,
a very plentiful shower on them; and at the same time a
furious hail, mixed with lightning and thunderbolts, on
the enemy, and thus he obtained a decisive victory.

 This is the account commonly given by ecclesiastical hi-
torians; and the whole story is engraved in bas-relieves
on the Antonine column. And hence arose the denomination
thunderers: though some say, that the legion those Chris-
tians were of was called the thundering legion before.

 This deliverance has been thought by many to have been
miraculous, owing to the prayers of the Christians who
were in the Roman army; and it has been supposed,
that the emperor wrote a letter to the senate on this occasion,
which was very favourable to the Christians; others, how-
ever, have thought, that the Christians, by a pious fort of
militia, attributed this unexpected and fearsome shower,
which faved the Roman army, to a miraculous interposition;
and this opinion, says Mothes, is indeed supported by the
weightier reason as well as by the most respectable au-
torities; and the letter of Marcus Antoninus is allowed;
even by the defenders of the miracle of the thundering legion,
to have in it manifest tokens of spuriousness, to be the work
of a man unskilful in Roman affairs, and who probably lived in
the seventh century. Mothes sums up the arguments on
this subject in the following manner: it is certain, he says,
that the Roman army encircled by the enemy, and reduced
to the most deplorable and even desperate condition by the
thirst under which they languished in a parched desert,
was revived by a sudden and unexpected rain. It is also certain,
that both the Heathens and the Christians looked upon this
event as extraordinary and miraculous; the former attribut-
ing it to Jupiter, Mercury, or the power of magic; the
latter to Christ, interposing, thus unexpectedly, in con-
sequence of their prayers. It is still farther beyond all doubt,
that a considerable number of Christians served, at this time,
in the Roman army, and it is extremely probable, that in
such trying circumstances of calamity and distress, they em-
ployed the merciful interposition and succours of their God
and Saviour. And as the Christians of the time looked
upon all extraordinary events as miracles, and ascribed to
their prayers all the uncommon and singular occurrences of
an advantageous nature that happened to the Roman empire,
it will not appear surprising, that upon the present occasion
they attributed the deliverance of Antoninus and his army
to a miraculous interposition which they had obtained from
above. But, on the other hand, it must be carefully ob-
served, that it is an invariable maxim universally adopted
by the wise and judicious, that no events are to be esteemed
miraculous, which may be rationally attributed to natural
causes, and accounted for by a recourse to the ordinary dif-
temperations of providence; and as the unexpected shower,
which restored the expiring force of the Romans, may be
easily explained without rising beyond the usual and ordinary
course of nature, the conclusion is manifest: nor can it be
doubtful in what light we are to consider that remarkable
event. Ecl. Hist. vol. i. 8vo. edit.

 Mr. Moyle and Mr. King had a curious and interesting
controversy on the subject of the thundering legion. The
learned Dr. Lardner has collected into one view every thing
relating to it of importance, in his Collection of Jewish and
Heathen Testimonies, vol. ii. ch. xv. sect. iii. p. 221, &c.

 Thunegen, in Geography, See Thunus.

 Thunoe, a small island of Denmark, between the
coast of Jutland, and the island of Samoe. N. lat. 55° 58'.
E. long. 15° 27'.

 Thunudromum, in Ancient Geography, a town,
with the title of a Roman colony, in Africa, in New
Numidia, according to Ptolemy. It is named Tysiumenien
Oppidum by Pliny.

 Thunusda, a town of Africa Propria, according to
Ptolemy, denominated by Pliny Thunudromum Oppidum.

 Thupe, or Thuppe, a town of Africa, in the interior
of Libya, upon the southern banks of the Niger. Ptol.

 Thuppa, a town of Africa, in the interior of Libya,
upon the northern bank of the river Gira.

 Thur, in Geography, a river of Switzerland, which
rises in the south part of the county of Toggenburg, and runs
into the Rhine, 7 miles S.S.W. of Schaffhausen.

 Thure, a town of France, in the department of the
Vienne; 4 miles W. of Chatellerault.

 Thurer, a river of France, which rises in the depart-
ment of the Upper Rhine, passes by Thann, &c. and joins
the Ill at Ensisheim.

 Thurgau, a country of Switzerland, with the title of
landgrave; bounded on the north by Swabia and the
lake of Constance, on the east by the lake of Constance,
on the south by the territories of St. Gall, and on the west
by the cantons of Zurich and Schaffhausen. It receives its
name from the river Thur, and, in its most extensive sense,
comprehends all the extent of country on both sides of that
river. Though somewhat mountainous towards the south,
yet it affords rich pastures; and its other parts, as approach-
ing nearer to levels, produce plenty of grain, with vegetables
and fruits of all kinds, as also wine. The country is popu-
lous, and well cultivated, containing fix towns, with several
handicome burghs, a great number of fefts, and upwards of
170 villages. About one-third of the inhabitants consists of
Roman Catholics, and in church affairs are subject to the
bishop of Constance. The other two-thirds, ever since the year 1543,
have been Calvinists. The Thurgau is a very ancient land-
grave, which, on the extinction of the counts of Old or
Hohen Frauenfelden, devolved to those of Kiburg, and, on
their failure, to the counts of Habburg, with whom it came
to the house of Austria, which continued possessed of it till
1460, in which year the Switzers, being at war with the
archduke Sigismund, wrested this country from him, which,
by the peace concluded at Constance in the following year, was confirmed to them. The cantons to which the territorial sovereignty of this country belongs, are the eight old cantons of Zurich, Berne, Lucerne, Schwyz, Unterwalden, Zug, and Glarus; but it was not till the peace of Aarau, that the seceded was admitted by the others as a co-sovereign. These eight every two years alternately appoint a landvogt over it, who resides at Frauenfeld; and since the year 1449, the cantons of Friburg and Solureve have also obtained a seat in its criminal court.

THURGOLAND, a township of Yorkshire, in the West Riding; 4 miles S.W. of Barnetley.

THURIA, in Ancient Geography, a town of Meffenia, on the river Aris, S.W. of Alagonia. It had a temple dedicated to the goddess Astarte, a Syrian divinity, supposed to be the same with Venus—Alfo, an island on the Egean sea, near Naxos, according to Plutarch.

THURIBULUM, among the Romans, a cenotaph, or vault, in which incense was burnt at sacrifices.

THURIFICATI, in Church History, a designation given to those who, to avoid the persecution of the Roman emperors, offered frankincense to the heathen gods.

THURII, THURINGIANS, a people of Germany, supposed by some authors to have been a part of the Vandals. They have been scarcely known in history since the fall of the Roman empire.

Towards the end of the fifth or commencement of the sixth century, Thuringia had a king, or at least a warlike chief.

THURINGIA, in Geography, a circle of Saxony, which forms the N. part of the landgrave of that name. The country is well watered, yields good pasturage, and abundance of corn, particularly wheat, which is excellent, as also fine timber, flax, anife, flax, flax, and wine; and has also a considerable breed of horses, horned cattle, and sheep. Of these natural productions of the country, a great part is exported. Thuringia contains in it 60 towns, 674 villages, and 300 noble estates. The modern Thuringia, which lies nearly between the Saale and the Werra, is but a part of the ancient Thuringia, a country formerly comprised under that name, extending itself much farther every way.

In the sixth century, the Franks and Saxons subjected the Thuringians to their dominions, whose country form that time forwards became divided into the North and South. North Thuringia, towards the N., extends itself beyond Harzwalde, quite to the river Elbe, and belonged to the Saxons. It was united with the duchy of Saxony, lost its name, and was at length annexed to Eastphalia, or to the eastern part of the county of Saxony. South Thuringia belonged to the Franks, and comprised in it the modern Thuringia, together with a large share of the modern Franconia, Hesse, &c. Till the eleventh century, it flourished under the emperors and kings, and besides the counts, we find also some dukes mentioned, to whom the German kings entrusted the government of this country. Ever since the thirteenth century, the margraves of Meifen, who afterwards became electors of Saxony, have been in possession of the landgraviate of Thuringia, which was at one time divided among separate lines, but returned again by the extinction of the latter to that of Meifen. It has been ceded to Prussia by the king of Saxony.

THURIS, in Ancient Geography, a town situated in the interior of Arabia Felix. Ptol.

THURIS, in Geography, a post-town of the county of Tipperary, Ireland, situate on the river Suire, which divides it nearly into two equal parts. There was formerly a castle belonging to the knights of St. John of Jerusalem, and there are full some ruins of a monastery. Thurlis is 70 miles S.W. from Dublin.

THURLEMORE, a lake of England, in the county of Cumberland, from whence a river runs to the Derwent; 3 miles S.E. of Keswick.

THURLOE, John, in Biography, secretary of state to the Protectorate, was the son of Thomas Thurloe, rector of Abbot's Roding, in Essex, where he was born in 1616. He was brought up to the law, and in 1644-5, by the intercessions of Oliver St. John, was appointed one of the secretaries to the parliamentary commissioners at the treaty of Uxbridge. Advancing through other offices, he went as secretary to lord chief justice St. John, and Mr. Strickland, in their embassy to the States-General. In 1652 he refe to the office of secretary to the council of state; and when Cromwell, in 1653, assumed the protectorate, he was nominated his secretary, on whom he repose peculiar confidence. In 1655 he was entrusted with the management of the post-office; and in 1656 he represented the isle of Ely in parliament. On the death of Cromwell he signed the order for proclaiming Richard, and in the following parliament was returned member for the university of Cambridge. He retained his office of secretary under Richard, and also under the parliament that deposed him. On the Restoration, he was accused of high treason and examined, but soon let at liberty. He then retired to his seat in Oxfordshire, and visited London, at his chambers in Lincoln's Inn, in term-time. Charles II. often invited him to take a part in his administration: but he declined it, alleging that perhaps he should not be able to serve the king, as he had done the protector, in connection with men of different characters and principles; the protector, as he told his majesty, was used "to seek out men for places, and not places for men." The abilities of Thurloe for public life were distinguished, and his character in private life no less amiable. He died in Lincoln's Inn, where he was mallet of the bench, in 1667-8, and was interred in the chapel. His密封 papers formed a valuable historical collection, and were published by Dr. Birch, in 7 vols. fol. 1742. Biog. Brit. Gen. Biog.

THURLOW, in Geography, a township of Upper Canada.

THURLOW's Island, a narrow island in the Pacific ocean, near the coast of North America, about 24 miles in length from E. to W. N. lat. 50° 24'. E. long. 233° 35'.

THURMAN, a post-township of the United States, in the state of New York, and county of Washington, erected in 1792 from Queenbury, and then comprising a great extent of territory, which has been since subdivided into other towns. Thurman is bounded N. by Chester and Johnsburg, E. by Caldwell and Bolton, S. by Saratoga county, and W. by Montgomery county. The first settlements commenced about 1786, and in 1810 there were about 200 families, mostly Scots, and the soil from the eastern flates, it has one Presbyterian and one Methodist meeting-house, and a pretty competent number of common school-houses and schools. The whole township is well watered, and Cran's mountain in the W. part of it is rich in mineral treasures. Much of this western part is still unsettled.

THURN, a town of the duchy of Slesia; 5 miles S. of Windisch Grätz.

THurn am Hand, a town of the duchy of Carniola; 2 miles S. of Gurkfeld.

THURNAU, a town of Germany, in the principality of Culmbach; 5 miles S.S.W. of Culmbach. N. lat. 50° 2'. E. long. 11° 26'.
THURNEISSER, Leonard, in Biography, a man of great temporary celebrity in chemistry and the occult sciences, was born at Baffe in the year 1530. Having imprudently, in 1547, when a boy, married a widow, who proved unfaithful; and having involved himself in debt, he found himself under a necessity of leaving both his wife and his native place. Accordingly, in 1548 he went to Strabburg, and from thence he proceeded to Constance, having, by different application to his trade of a goldsmith, amassed a considerable sum of money. He employed himself in the construction of mathematical instruments, and in a variety of metallurgic operations with such reputation, that he was entrusted with the direction of the smelting works at Eberfeld in the Tyrol. During his abode at Constance, he married the daughter of a goldsmith by whom he had been employed, and in 1558 retired with her to Tarenz in the Upper Innthal, where he formed metallurgic establishments on his own account, and constructed furnaces, together with a manufactury for the preparation of sulphur. Here he was visited by several persons of eminence, and became known to the emperor Ferdinand; and patronized by the emperor's son, the archduke Ferdinand, he travelled, by his connex, in 1560, to Scotland and the Orkney islands, and in 1561 to Portugal and Spain, and also to some parts of Africa and Asia. On the summit of an island he received the order of St. Catharine; and in his way home he visited Candia, Greece, Italy, and Hungary. When he arrived in the Tyrol, he found his establishments in great confusion; but he was enabled by the government of Innsbruck to revive and support them. He was then deputed by the archduke to examine the mines in Hungary and Bohemia; but notwithstanding this high patronage, he involved himself in debt, and by his pride and extravagance forfeited the favour of his patrons. In 1569 he obtained leave to visit Lower Germany, for the purpose of making some observations in natural history, and of superintending the printing of some of his works. During the leisure afforded by some of his sea-voyages, he had composed, in German verse, a work intituled "Archidoxia," or an account of the influence which the planets have on the human body, and on all the employments of man; together with a secret introduction to alchemy. He had prepared also another work, called the "Quintessence," in which he pointed out the connection between medicine and alchemy, and gave instructions how to extract from all substances their quintessence or subtile parts. He pretended also to have made some other curious discoveries, which we cannot detail.

At Munster he published, in 1569, the first edition of his "Archidoxia," in 4to.; and his "Quintessence" was printed there, also in 4to., in 1570. These works were afterwards enlarged and published in folio. Thurneisser, quarrelling with the bishop, left Munster and removed to Frankfort on the Oder, to print his "Pison," or Description of Rivers, by which, together with his calendar and book on plants, he acquired the greatest share of his reputation. Having cured the margrave of Brandenburg of a dangerous illness, the margrave appointed him his physician, and defrayed the expense of bringing his wife and family from Constance. In 1572 he published his work "On Urine," in which he affirms, that by examining the urine of Sigismund I., of Poland, he had discovered the nature of his disease, and predicted his death, with the day on which it would happen. Under the patronage of the margrave of Brandenburg he went on perpendicularly with his laboratory and printing-premises; and indulged in the most expensive and splendid mode of living. His visitors were numerous, and of the first rank; and among his correspondents were the emperor Maximilian, and Elizabeth queen of England. He was confounded not only in all kinds of difeases, but on witchcraft, magic, and other such matters. His printing-premises was in high estimation. By printing, and the sale of his MSS. and preemptions, he acquired great wealth. For the MSS. the elector, John Gruge, gave him 9000 dollars; and there was formerly in the king's library at Berlin, a MS. entitled "De Transmutatione Veneris in Sollem," for which an annual pension of 600 dollars was settled on him and his children. He was the first person who formed a collection of natural curiosities in the Marche of Brandenburg. He had also a garden filled with plants for the study of botany, and a menagerie, containing a collection of various animals from all parts of the world. In 1575 he lost his second wife, who arranged all his affairs with great prudence; and this was the era of his downfall. From opulence he was reduced to poverty. His reputation as a physician declined. Dr. Hoffman of Frankfort, in his oration "De Barbaricin Imminente," was formidable to his credit, and he contrived means to prevent its being printed till the year 1578. Thurneisser, tearing utterly to lose his character, prepared for his departure from Berlin, and retired to Baffe, where, in 1580, he married a third wife. Withdrawing from domestic quiet into Italy, he is said to have converted, in the presence of the grand duke, Francesco de Medicis, one half of an iron nail into gold. This singular man died in 1595, or 1596, in a monastery at Cologne, after requesting that his body might be interred close to that of Albert the Great. A list of his works is given by Haller in his Bibliotheca. Gen. Biog.

THURTOZ, in Geography, a river of Hungary, which runs into the Waag, 12 miles N. of St. Martin. It gives name to a county.

THURROCK GRAYS, or GREAT THURROCK, a market-town in the hundred of Chafford, and county of Essex, England; is situate 22 miles S.S.W. from Chelmsford, and 24 miles E. by S. from London. It acquired the appellation of Grays from the noble family of that name, who possessed the manor for upwards of three centuries, from the year 1194, when it was granted to them by king Richard I. The town consists principally of one irregular street, on the banks of a small creek from the Thames, navigable for boats and vessels of small burthen. A weekly market is held on Thursdays, chiefly for the sale of corn, and is much frequented: here is also an annual fair. The church is built in the form of a cross, with a tower on the north side. By the return under the population act of the year 1811, this parish was stated to contain 114 houses, and 1055 inhabitants.

In the adjacent parishes of Chadwell and Little Thurrock are various caverns, or holes, of unequal depths and dimensions, formed in the chalk, which here constitutes the upper stratum: they appear to open from the top by a narrow circular passage, which near the bottom begins to spread, and communicates with subterranean apartments of different forms. Dr. Derham measured fix of these caverns, and reports them to be of various depths, from fifty to eighty feet. The origin of these excavations is uncertain; the opinion of some modern writers, that they were the granaries of the Britons, seems by far the most rational supposition. They are also called Dane Holes, and traditionally reported to have been used as receptacles or hiding-places for plunder during the frequent incursions of the Danes into this island.—Beauties of England and Wales, vol. v. Essex; by J. Britton and E. W. Brayley.

THURSDAY, the fifth day of the Christians' week, but the sixth of that of the Jews. See THURSDAY.
THURSDAY, Holy. See Holy.
THURSDAY, Monday. See Monday Thursday.
THURSDAY, store, in Evidences, a species of fish mentioned by Pliny, ib. ix. cap. 9. It is thought by some to be the

place, or porpoise; and by others the

f节目.

THURSO, or Thorsay, in Geography, a market-town

in the burh of Caithness, Scotland, is situated on the northern

side of the coast, at the extremity of a spacious bay, on the

estuary of the river Thurso, at the distance of 279 miles N.

from Edinburgh. The town is irregularly built. A new

town, on a regular plan, has been lately commenced at

Thurso, in consequence of which, the inclosed lands let for

five guineas per acre per annum. Here is a fine bay or

harbour, which is progressively much improved in conve-

nience and security. Eight vessels belong to the town, and

are chiefly employed in conveying salmon to London.

Although the customs of this port are very inconsiderable,

yet the following officers are regularly stationed here; a col-

lector, comptroller, land-surveyor, land-waiter, two esta-

lished tide-men, and one extraordinary tide-man. Thurso

is a borough of barony, holding of Sir John Sinclair as im-

mediate superior. The charter of erection was granted by

Charles I. in 1633, in favour of John Matter, of Berriedale,

by which it was entitled “to all the privileges, immunities,

and jurisdictions, belonging to a free borough of barony in

Scotland.” It is governed by two bailies and twelve coun-

sellors, who are appointed by the superior, and hold their

offices during his pleasure. A well-supplied market is held

on Fridays; and here are two annual fairs, one of which

continues for ten days. The principal manufacture of the

town is coarse linen cloth; in the neighbourhood are a

bleach-field and a tannery, both of which are prospcrouis.

In the population return of the year 1811, the town and

parish of Thurso were estimated to contain 592 houses,

inhabited by 3462 persons. The parish extends about three

miles from the town in every direction, except to the north-

west, where it is bounded by the sea. The rocks that

bound the coast exhibit various scenes of natural grandeur.

The Clett is an inflated rock about 160 yards long and 80

breadth; it is elevated about 400 feet above the level of the

sea; and during the spring season, is frequented by in-

numerable flocks of sea-fowls.

Thurso East, anciently called Thurso Castle, once the

residence of the earls of Caithness, is now the seat of Sir

John Sinclair, bart. a native of Thurso; a gentleman whose

exertions will ever be revered by men of science for “The

Statistical Account of Scotland.” In the park are the ruins

of a small chapel, where earl Harold the younger was buried,

and where a neat modern monument has been erected by the

above-mentioned baronet.—Beauties of Scotland, vol. v.


THURSO, a river of Caithness, which runs into the sea, at

the town of Thurso.

THURS, in Natural History, the name of a creature
defcribed by Géniel, and some others, as a difficult species of

wild bull; but the accounts of it seem either fabulous or

mistaken descriptions of the wild bull.

THURY, in Geography, a town of France, in the de-

partment of the Yonne; 10 miles S.E. of St. Fargeau.—

Also, a town of France, in the department of the Oise; 7

miles S.E. of Crepy.

THUS, a town of Feria, in the province of Khorassan ;

200 miles N.W. of Herat.

Thus, a river of Feria, which rises near Mefghid, in

Khorassan, and runs into the Caspian sea, 40 miles N.W. of

Zaweh.

Thus, See Frankincense.

Thus Judeorum, called also caftarilla and cortex ele-
therris, in the Materia Medica, is the bark probably of the

thurb described by Cato, under the name of vinaeides
eleagni folio or stherris, the corona caftarilla of Linnaeus,

which grows plentifully in most of the Bahamas islands;

thence it is brought to us in curled pieces, or rolled up

short quills, about an inch wide; covered on the outside

with a rough whitish matter; and brownish within; and

exhibiting, when broken, a smooth close blackish-brown

surface. The bark, freed from the outer coat, has a light

agreeable smell, and a moderately bitter tafte, accompanied

with a confiderable aromatic warmth. It is easily inflam-

mable, and yields, whilst burning, a fragrant smell, some-

what resembling that of mufl. Stiffer was the flirt who

employed this bark as a medicine in Europe; who relates

that a tincture of it in alkaliized vinous spirits, or in dulci-

died alkaline spirits, proved carminative and diuretic, and
did service in arthritic and scorbutive cafes. In 1694 and

1695, it was employed by Apinus in an epidemic fever of the in-

termittent kind. The gentlemen of the French Academy

found this bark of excellent service against an epidemic

dysentery in 1719, when the ipecauanha proved ineffec-

tual. At present it is of great esteem among the Germans, as a

warm fomachic and corroborant, in flatulent colics, in-

ternal hemorrhages, dysenteries, the diarrhoea of acute

fevers, and, mixed with the Peruvian bark, in common in-

termittents.—Among us it has been lately received into prac-

tice; but its use, says Dr. Lewis, is not yet become so

general as it well deserves to be. Its virtues are partially

extracted by water, and totally by rectified spirits. Lewis’s

Med. Mat.

Thus, in Sea Language, the order by which the pilot

directs the helmsman to keep the ship in her present situation

when falling with a feant wind, so that the may not approach

too near the direcHon of the wind, and thereby shiver her

fars, nor fall to leeward, and run farther out of her course.

Falconer. See STEERING.

THUSCUS VICTUS, in Ancient Geography, the name of

one of the seven mountains of Rome, called also Colius Mons.

THUTHOA, a river of the Peloponnesus, in Arcadia,

which discharges itself into the Lodon.

THUYA, in Botany. See Thúza.

THWAITÉ, in Ichthyology. See SHAD.

THWART, in a boat, the feet or bench of a boat on

which the rowers fit to manage the oars. Hence thoughts,

(white fee.) is used in the fame fense.

THWART the Haws, in Sea Language. See ATHWART.

THWART Ships, across the ships. See ATHWART.

THWART the Way, in Geography, a small island in the

Straits of Sunda. S. lat. 5° 55'. E. long. 105° 43'.—

Also, a small island in a bay on the coAft of New Guinea.

S. lat. 2° 15'. E. long. 136° 54'.

THWATER, Trembling, or Leaping-ill, a disease

in fleep, of the shaking, jumping, and convulsive kind.

These different forms, some of which were formerly par-

ticularly used in one part and another in another, especially in

the northern districts of the kingdom, are now said to be

had recourse to indifferently, and applied indiscriminately to

all diseases which, on a dry foil, proceed from a weak and

enfeebled rate of body and barren feaons. Under this

threefold name, some fay they have been fleep suffering by
diseases, which at leat had much resemblance to those of

several other forts, as the apoplectic, paralytic, rheumatic,

&c.; and that even when an old fleep falls down, and

dies of weeknesses and exhaustion, the manner of its death

differing somewhat from that of the hog-fleep, it is frequently

affected by fhepherd to the thwarter or trembling-ill.

There
There is, on the whole, so much contrariety of opinion, and diversity in the descriptions of the diseafes, its caufes, and the means of cure, that the writer of a paper on some of the diseases of sheep, in the third volume of the "Trans-
actions of the Highland Society of Scotland," has divided and considered it under two different species.

The first variety, it is laid, is much more rare than for-
merly, and is scarcely known in the Highlands of the above
country. It appears mostly in the spring and harveft
seasons. It affects sheepe of all ages and kinds, but never
when in good condition, excfling chiefly on dry farms, which
have a northern exposure, and which are evidently over-
flock'd; but on these only when the spring is feverell and
dry, or when early Aprill grass has been cut down by frofis,
and the sheep can find no succulent food or any thing green.
Its production is favoured by a long continuance of eafierly
winds; and in cold weather, ewes are sometimes attacked by
it, even after they are f深圳ed. In these circumstances they
become extremely emaciated, espefially when heavy with
lamb in many of them, or giving fuck; and when at this
time they get an overfretch in running or leaping, or even as
halfly start, or crurfh in the fold, numbers fall a prey to
this disorder.

The appearances are, that fome sheep, it is faid, will fall
down and die in two or three minutes; others will lofe the
power of one fide, and lie fpawling until they die of hunger;
others again will lie flivering, and very fick at times, until
death alfo comes on; and fome will go a long time quite
fame, until they are likewife quite exhausted. Others defcribe
it as of two kinds; in one, fometimes feizing the whole fyllen,
when there is a general trembling over the whole body, and
in the other, fometimes affecting the legs only, when the
animal immediately falls down, and the fhaking, which is
interrupted, is confined to the legs. Some fay that the
animal gradually lofes the power of its legs and body, until
it becomes quite weak, always lying at falt upon one fide.
Thefe sheep which die off in spring, are lean and ufeless;
but the mutton of fat hog-fheep carried off by it in the
autumn is not uetable. It is sometimes extremely fatal.
In one inftance, out of a flock of forty fcore, feventeen
fcore were, it is flated, loft in one spring. It was formerly
thought to be contagious, and although this can fearely be
the cafe, it is certainly molt deftructive when it ftrikes
among a flock; and when fheepe are brought from a clean
ground to one infected with it, great numbers of them are
fure of dying. Thofe which furvive it one fandon, are fure
to relapfe the next spring.

Udder-locking should be entirely laid afide, as in one in-
ftance, one-twentieth of a large parcel of ewes is faid to
have died of the difeafe, in the course of a week after they
had been udder-locked. See UDDER-Locking.

It is alfo faid to be ufeful during the early fpring months
for to provide them with fufficient food and felter; and to
avoid overflockng, if the early grass has been blighted, to
paffure them in a rich park or other ground, on water-
meadow, or on meaf or early rye-grafs.

The fcranl variety of the difeafe is, it is remarked, chiefly
confined, in the above part of the kingdom, to the flocks in
the south of it, more efpecially about the banks of the river
Tweed, and of tho which difcharge themfelves into it.
It is faid to be a complaint almoft unknown to the farmers
on the Pentland range, and to the north of the Forth.
In those places where it prevails, it is fometimes peculiarly
fatal, and a farmer often lofes more of the flock by it alone,
than all the other difeafes put together.

The appearances when it first comes on, which is gene-
 rally during the summer or harveft months, are, that the
animal turns somewhat flupid and neglects its food, does round,
in some measure, as in the flurdy, and frequently
leaps up, as if to clear any hulf or dikke before it; at times,
it will eat voraciously, and again refufe all influence for a
confiderable time. It continues frequently leaping during the
day, and the neck is often stiff, and turned on one fide;
convolutions take place in the limbs which caufe the animal
to fall down, make curious contortions, and at times run to a
little difance; the body fometimes partakes of thefe, when
the fheepe becomes totally incapable of motion, and dies from
want of food, which the jaws will not open to admit, being
clofely wedged together. In this fteate, it is unable to fol-
low the flock, and the wool claps to the body. It lies for a
long time motionlefs, and at length dies. After lying
motionlefs for a confiderable time, in those cafes where
the difeafe is not to violent, and the fpavin of the jaw not
foucerv, it gradually relaxes, and the sheepe will eat the
whole of the food within reach quite bare, although the
power of the limbs is totally gone, leaving the earth quite
red and naked all round them. If the fhepherd be at-
tentive, and lifts them from place to place, and the fean be
pretty well advanced, they often flowly recover, and are
again refured to the ufe of their limbs. When they lie in
this inactive fteate, if the weather be warm, maggots are very
apt to breed in them; and if not attended to, foon defroy
them.

The difeafe moftly appears at the periods stated above,
especially during hot and fultry weather, and arises either
from the fheepe being put into violent motion by dogs, or
overheated by the fun; in which cafes, in a few hours after-
wards, it makes its appearance by the fluff neck, or fome of
the other figns coming on. When the fheepe are exposed
to fatigue, it will take place, if the weather be warm, inde-
pendent of violent motion. They are commonly the
caffethyl of the flock that are cut off by it. It not un-
frequently arifes from the braxy, of which it is moftly a fa-
vourable fign. It is never fever, however, when it is the
confequence of that difeafe, and the fluff neck never accom-
pnies it.

In regard to the means of cure in the fcranl fort, they
are various. When the fheep fall down suddenly, and are
threatened with immediate death, bleeding, by cutting
the tail, or opening a vein on the inide of the fore-thigh,
will sometimes give immediate relief. In all the other
cases it is proper to take them home and feed them with
ftrongeafing food; and if at this time they be attacked
with a temporary fcoring, they moftly recover very falt, and
foon acquire their former vigour. It is faid that some few
means of cure are occasionally tried, but it is believed with
little fuccefs. Dipping in cold water is not unfrequently
practifed: whisky and gunpowder are sometimes poured
down their throats; and balls of mustard and other hot
pungent medicines are often administered. Others re
commend bringing them into the houfe, giving them a mixture
of equal quantities of fallad oil and spirits, with a little
finely powdered ginger, and at the fame time rubbing into
the back a little black soap broken in warm water, and
feeding them on hay, the produce of dry walks or other
grounds.

The giving of the fheep a decoction of the dewcup and
healing leaf boiled in butter-milk, is faid to have been uni-
formly successful in treating sheep affected with this disorder
during the summer and autumn.

In the removal of the fcranl kind of the difeafe, as it
arifes from the brain being oppress'd, by too much blood
being sent to it by the quickened circulation, the fcranl thing
to be attended to on its appearance is copious blood-letting,
which
which will be more effectual if taken from the veins of the neck, or from a vein on the outside of the eye, mostly well known to shepherds. It may even be taken from the tail, or fore-leg; but opening of the veins of the head is generally considered as the most proper and beneficial in this species of the complaint. As there is too great a determination of blood to the head, it will be attended with advantage to make a determination to the bowels, by illuminating them by means of purgatives, such as those of common salts, one ounce or more: calomel, from ten grains to half a drachm; or, what is supposed more proper, as it also acts upon the kidneys and skin, a dose of half an ounce or more of nitre. These remedies are to be persevered in, until all marks of the disease disappear. But if the sheep be too far gone in the disorder, and has lost all motion, it should be killed for the sake of the carcase, which in this species of the disease is not affected, or at least but very slightly.

In the managing of the cure, much nice attention is necessary in both kinds of this disease.

THY, in Geography, a town of Prussia, in Pomeralia; 7 miles N. of Marienburg.

THYAMIA, in Ancient Geography, a town of the Peloponnesus, in Sicilya. Xenophon.

THYAMIS, a town of Arcachia, founded by Semiramis.—Alfo, a promontory of Epirus, between Theborea and Cethrini.

THYARIS, a river of Asia, in Phrygia Salutaris, which passed through the northern part of this province, and discharged itself into the Sangara.

THYATIRA, A Phoras, a town of Asia Minor, in Lydia. According to Steph. Byz. it was very ancient, and called Pelope, Pelopon, or Pelopia, and afterwards Semiramis. According to Pliny it was also denominated Eupippa. It derived its name of Thyatira, from the Greek word signifying daughter, from Seleucus Nicanor, who received the news, as it is said, at this town of the birth of a daughter. From an inscription found in this city, it appears that Adrian had a temple in it; and medals have been found here that were struck in honour of Adrian. Strabo says that the town of Thyatira was considered by some authors as the birth of the district of Mylia, and that it was a colony of Macedonians. After Scipio had defeated Antiochus near Magnesia and Sipyla, the town of Thyatira sent ambassadors to the Romans, to render them homage. Thyatira was taken by Artilonicus, in the year 140 B.C., but this prince having been taken prisoner in the same year by the confed Perpenus, this town reverted to the dominion of the Romans. Thyatira was much distinguished by the benefactions of the emperor Caracalla; and it appears by a medal of this town, that under the reign of this prince it took the name of Neoecoros. This place was one of the seven churches of Asia, mentioned in the book of Revelations; so that the Chilrian religion was introduced here by the apostles and their immediate disciples; but whether the church was founded by St. Paul or St. John, or by either of them, does not appear.

The inhabitants of Thyatira had a particular veneration for Diana. This appears from many inscriptions found in this town, of which this goddess bears the title of "Diana Montana." The town was situated at the southern foot of a chain of mountains, on the route from Hermus to Sardis, and it was watered by a stream of the river Caucus. The town suffered much by an earthquake in the reign of Tibereus. See AKHISAR.

THYIA, or S, in Antiquity, a festival in honour of Bacchus, celebrated by the Eleans.

THYITAS LAPIS, in the Materia Medica of the Ancients, the name of an indurated clay, approaching to the nature of a stone. It was found in Egypt, and used in different temperatures of the eyes.

This substance has been very much misunderstood by late writers, and by most of them supposed to be lost at this time; but this was wholly owing to their mistaking the clays of bodies among which they were to look for it: some imagining it to have been a species of green marble; and others to have been turquoise-blue, that Dioscorides meant by this name. It is very plain, however, that it was no other than an indurated clay of the morrochus kind, and no more a stone than that substance, that being also frequently called lapis morrochus.

It is of a smooth, even, and regular texture, very heavy, of a shining surface, and of a pale green, without the admixture of any other colour. It does not at all adhere to the tongue, nor stain the fingers in handling; but drawn along a rough surface, leaves a flender white line. It melts slowly in the mouth, and is of a sharp, acrid, and disagreeable taste; and when rubbed down with water on a marble, it melts into a milky liquor of a pure white, not the least greenness being sensible in it. It is found at present in the great mine at Gofidar in Saxony, and seems to owe its colour to particles of copper, to which also it owes the virtues attributed to it by Dioscorides, acting as a weak kind of verdigris. Hill.

THYLACION, a word used by the ancient medical writers, to express the bag formed by the membranes of the eyes at the orifice of the pudenda, before the birth.

THYLLA, of 2nd a, in Antiquity, a festival in honour of Venus.

THYMALLUS, in Ichthyology. See Grayling, and SALMO THYMALLUS.

THYMATERIUM, in Ancient Geography, a town of Africa, in Libya, two days' journey beyond the columns of Hercules, according to the Peripus of Hannon; it is the Thymateriæ of Steph. Byz.

THYMBRA, a town of Asia Minor, in the Troade, according to Steph. Byz., who says that it was founded by Dardanus, who gave it its name after that of his friend Thymbros. Apollo had a temple here under the appellation of Thymbrian. Strabo says that a stream called Tymbrius traversed its canton, and that this stream discharged itself into the Scamander, before the temple of Apollo. Servius says that Achilles was wounded here by Paris; and this circumstance gave occasion to the report that the wound was inflicted by Apollo.

THYMBRÆA, or Tymbra, a mountain of Asia, in Phrygia. THYMBRA, in Botany, a name borrowed from Dioscorides, whose real genus, however, is a species of SATIVA, see that article, n. 3. Linnaeus therefore has adopted the above name for another Greek genus, nearly akin to the original plant.—Linn. Gen. 288. Schreb. 385. Willd. Sp. Pl. v. 3. 46. Mart. Mill. Diæt. v. 3. 471. Gray. Hort. Kew. v. 3. 375. Sm. Prod. Pl. Græc. Sibth. v. 1. 998. Jaff. 115. Lamarck Illutr. t. 512. Clas and order, Didynamia Gymnofermis. Nat. Ord. Verticillata, Linn. Labiate, Jaff. Gen. Ch. Cal. Perianthus inferior, of one leaf, nearly cylin- drical, with a longitudinal hairy keel at each side, the orifices of which are two-lipped; upper lip broadest, cut half way down into three equal converging segments; lower in two deep narrower segments. Cor. of one petal, ringlet, tube nearly cylin- drical; upper lip flat, ascending, obcute; lower in three, nearly equal, flat lobes. Stam. Filaments four, thread- shaped, approaching each other in pairs, two of them shorter than the rest; anthers of two or divided lobes, under the upper lip of the corolla. Pfi. German superior, four- cleft;
cleft; style thread-shaped, cloven a little way down; filaments two, acute. Pericarp none, except the unaltered calyx.

Seeds four.

Eff. Ch. Calyx nearly cylindrical, two-lipped, marked on each side with a hairy prominent line. Style cloven.

1. *Th. ficata*. Spike-flowered *Thymbra*. Linn. Sp. Pl. 795. Willd. n. t. Ait. n. 1. Sm. Fl. Greece. Sibth. t. 546, unpublished. (Th. spicata verior hispanica; Barbel. Ic. t. 1230. Thymus majus longifolium, &c.; Pluk. Phyt. t. 116. f. 5.)—Flowers spike'd. Leaves lanceolate.—Native of the Levant, on dry hills. Dr. Sibthorp met with the plant in Crete, Aia Minor, and Greece, and conceived it to be the *Hymenoptera officina*, or Mountain *Hylyos*, of Dioscorides, which is extremely probable. The *flem* is shrubby, very bushy, about a foot high, with numerous, upright, sessile, leafy, purplish, quadrangular branches, whose opposite sides are often densely downy, in an alternate manner between the different pairs of leaves, the pubescence recurved. *Leaves* opposite, sessile, crowded, spreading, acute, entire, about an inch long, smooth on each side, besprinkled with refrinous dots, and fringed at the margin with conspicuous white hairs. They are accompanied by axillary tufts of smaller and narrower leaves. *Flowers* of a fine reddish purple, in solitary, terminal, dense, leafy, whorled *spikes*, from two to four inches long. Calyx reddish, abounding in essential oil, smooth and naked, without ribs, except the lateral line at each side, which is fringed, as well as the teeth, with strong white hairs. *Braeaces* lanceolate, fringed, purplish. Tube of the corolla twice the length of the calyx, somewhat downy; lower lip deflexed, in three obtuse equal segments, hairy about the throat. The whole herb has the warm pungent flavour of Thyme, and the aspect of *Hylyos*.

2. *Th. verticillata*. Whorl-flowered *Thymbra*. Linn. Sp. Pl. 796. Willd. n. 2. Ait. n. 2. (Hylypos montanus; Dalch. Hist. 934; not 394, as Willdenow, copying Linneus's typographical error, has it.)—Flowers whorled. Leaves linear-lanceolate.—Native of the south of Europe. The *flem* is shrubby, but more slender than the last, hairy in the same manner, but more universally. *Leaves* much narrower, dotted and fringed in the same manner. *Flowers* axillary, from top to bottom of each branch; those of the principal one fix in each whorl; those of the lateral branches only two. In stature, size and colour they agree with the foregoing, only the *calyx* has some appearance in the dried specimen of being more ribbed. Its lateral keels, as well as the teeth, are strongly fringed. Nevertheless, the general hue and aspect of these two plants are so much alike, that there seems great reason for Linneus's substitution of their being varieties of each other. At the back of the original specimen of this last is the following synonymy. *Tragoriganum ceterium*, majorae ciboria alpestris folio; Propr. Alpin. Exot. 79. So confused is this old author, that one can hardly tell which of his plates his loose descriptions refer to; but our plant certainly agrees better with his *Thymbra*, t. 80, than with his *Tragoriganum*, t. 78, though the above synonymy seems to indicate the latter.

3. *Th. cilicia*. Capitate-flowered *Thymbra*. Desfont. Atlant. v. 2. 10. t. 122. Willd. n. 3.—*Flowers* capitate. Leaves linear. *Braeaces* ovate.—Found by Desfontaines, on dry hills and uncultivated spots, near Mafcar, in Algiers. A small bushy *herba*, from eight to twelve inches high, agreeing much in habit with the two preceding species; but the *leaves* are linear; while the *braeaces* are broader and more ovate, as well as the *spikes* much shorter, than in the *Th. spicata*. The *leaves* are equally fringed in all. Nothing is said, or expressed in the figure, of any hairy lateral lines on the *calyx*, the most important character of *Thymbra*. Having seen no specimen of this species, we cannot judge with certainty respecting its genus, nor whether it might not rather be referred to *Satureja*, see that article; but we cannot satisfactorily assent to the opinion of its learned discoverer, that these genera are not sufficiently distinct. The *calyx* in the natural order to which they belong affords, in many instances, clear, though nice, generic differences. At the same time we admit that Linnaeus is incorrect in making a femia of this, &c., &c. until it be understood a style cloven half way down, one of the essential marks of a *Thymbra*.

*Thymbra*, in *Gardening*, furnishes plants of the under shrubby, exotic kind, among which the species cultivated are the spike'd *Thymbra* (*T. spicata*); and the whorled *Thymbra* ('T. verticillata').

Method of Culture.—These plants may be increased by seeds, slips, and cuttings. The seeds should be sown in the early spring in a warm border, and sheltered from bad weather by glasses; or, which is better, in pots filled with light mould, and placed in a mild hot-bed: when the plants have attained some growth, they should be let out or removed into separate pots.

The slips and cuttings should be planted out in the spring and summer, and when well rooted, removed where they are to grow; they also sometimes succeed by bottom offsets, planted out as above.

They afford variety among other potted greenhouse plants; and require the protection of such houses during the winter season; in this climate, in almost all situations and places.

*THYMBAEUS Mons*, in *Ancient Geography*, a mountain of Aia Minor, in the Troade; from which, according to Pausanias, Apollo was denominated Thymbrian.

*THYMBAEA*, a place of Ionia, four fathoms E.S.E. of Myus. The cavern Charon was near Tymbria, which was thought to be one of the mouths of Hell, because from it issued pestilential vapours.

*THYMIBRUM*, a town of Aia, in Phrygia, at the distance of twelve parasangus from Caylfrudum. At this place was a fountain, called the fountain of Midas, king of Phrygia.

*THYME*, in *Botany*. See *Thymus*.

In the *Materia Medica*, the common garden thyme is a moderately warm pungent aromatic. To water it imparts by infusion its agreeable smell, with a weak tinge and yellowish or brown colour; in distillation, it gives over an essential oil, in the quantity of about an ounce from thirty pounds of the herb in flower, of a gold yellow colour if distilled by a gentle fire, of a deep brownish-red if by a strong one, of a penetrating smell like that of the thyme itself, but less grateful, and in taste exceedingly hot and fiery: the remaining decoction, infusible, leaves a bitterish, roughish, sublimate extract. The active matter, which by water is only partially dissolved, is by rectified spirit distilled completely, though the tincture discovers the essence of thyme than the watery infusion; and the spirit brings over, in distillation, a part of its flavour, leaving an extract of a weak smell, and of a penetrating camphorated pungency. Murray has observed, that this plant seems actually to contain a species of camphor.

The virtues of thyme, according to Bergius, are resolvent, emmenagogue, diuretic, tonic, and ramachic. As agreeing, says Woodville, in common with the natural order of verticillata, its aromatic qualities may be found equally useful in some of thefe complaints for which lavender, sage, rotemary, &c. are usually employed.

The *serpyllum*, or mother of thyme, is an elegant aromatic 4 G 2 plant,
plant, similar to the preceding species, but milder, and in flavour rather more grateful; its essential oil is both in smaller quantity and less acute, and its spirituous extract comes greatly short of the penetrating warmth and pungency of that of the others, so that it is less medicinal than the other species. It is said to afford an agreeable distilled water, more durable, but less active and penetrating than pepperment. (Lewis.) This has been much extolled as a nervous stimulant. An infusion of it has been said to do wonders in turnours, lowness of spirits, and head-aches; and it has been much commended for the cure of the night-mare.

The lemon-thyme, which is a variety of the last, is less pungent than the first sort, but more so than the second, and much more grateful than either. Dililled with water, it yields a larger quantity than the other sorts, of a yellowish very fragrant oil of the lemon-flavour, containing nearly all the medicinal parts of the plant. It gives over also, with rectified spirit, its finer odorous matter. Lewis.

Thyme, Cat. See Tueichum Marum.

Thyme, Maftich. See Thumas Maftichina.

Thymelœa, in Botany, from Juvius, thyme, and Makia, an olive, (the first alluding to the leaf, and the latter to the fcape and oilnests of the fruit,) is an ancient Greek name, found in Dioscorides, book 4, chap. 173. His Juvius, there defcribed, is thought to be the Daphne Gnidium of Linnaeus; and must be at least one of that natural order, and, probably, genus. Hence the name has been applied by many botanists, amongst which were the Baulins and Tournefort, to what Linnaeus called Daphne; see that article. This latter appellation was preferred by him and his school, because a name composed of another, already deflabilis, is contrary to a very found law of the Philosophia Botanica; and in the present infrence the word is compounded of two other generic names, though one of them has been made Latin in Ola. The French however still hanker after Thymelea, as appears by Juffieu's choosing it for the title of one of his Orders. See Thymeleæ.

Thymeleæ, the twenty-fifth of Juffieu's Natural Orders, or the second of his fieth clas, thus named from an ancient fynonym of the genus Daphne, which makes a principal figure herein. (See Daphne and Thymelea.) This order is analogous to the Vpeculæ of Linnaeus. For the detailed characters of Jussieu's sixth clas, see Læuri.

The order of Thymelea is defined as follows.

Calyx of one leaf, tubular, inferior. Corolla none; but in some infinaces there are petal-like scales, originating from the mouth of the calyx, which have the appearance of a polypetalous corolla. Stamens definite, inserted into the calyx, and for the most part double the number of its segments, some being opposite, others alternate therewith. Germen superior, simple; style solitary; stigma mostly univalved. Seed solitary, superior, either naked, or pulpy, or clothed with the calyx. Embryo delinated of albumen; its radicle superior. Stem more or less shrubby. Leaves generally alternate.

We may add to these characters of Jussieu the remarkable silky appearance of the inner bark, when a twig is broken. Mr. Brown, Prodr. Nov. Holl. v. i. 358, observes that the general number of flaments is eight, sometimes four, rarely but two; in the latter cases always opposite to the segments of the calyx, which are occasionally five, sometimes, not always, with ten flaments. The fame writer informs us there is sometimes a flight portion of albumen. The leaves are entire, delinated of stipular. Flowers capitate or plicated, terminal or axillary, sometimes solitary.

The genera, as they stand in Jussieu, are Dirca; Lagette; Lamarek Illusrf. t. 281; Canistræ, Jull. append. 448; Daphne; Passengeria; Stellera; Struthiola; Lachna; Dosia; Gnidia; Metandra of Bergius, included under Gnidia by Linnaeus; and Quisquatia. To these is to be added the great diandrous genus of Pimelea, of which Mr. Brown defines thirty-four New Holland species.

The order under consideration is one of those which has most excited the question of what is a calyx, and what a corolla? and is appealed to equally by those who maintain different theories on this intricate subject. It seems to us that the Thymeleæ combine both these parts in one, the coloured inside of their calyx having exactly the nature of a corolla; which is confirmed by the remark of Jussieu, that the tube of Daphne Mezereum is double, formed of two layers. The appendages, in the form of scales, or glands, found in Gnidia and Struthiola, are more evidently petals, and would doubtless be universally taken for such, did not analogy and theory call a doubt over the subject. At any rate it is safe to say that Daphne has a coloured calyx, as well as most of its allies; just like Polygonum, in the generally coloured order of Holocarne, or Arrylees.

Thymeleæ Radis, in the Materia Medica, the dried root of the thymeæ folis lini of Tournefort and other authors.

It is a light root of different sizes, of a reddish colour without, and greyish within, woody, and full of fibres, and taints sweet at first, but is hot as fire when it has been held a little time in the mouth. It loses however both this fiery taste, and its acrid quality, in long keeping, and with them its virtues.

It is to be chosen now, well fed, and not worm-eaten. The fruit of this plant is the granum cuminum of the shops. They are both of an acrid quality, and are not in use in the shops at present.

Thyme, in Biography, a celebrated female Grecian, who invented theatrical dances. It is supposed that the Greeks called their comediens Thymelici from her name.

Thyme, in the Ancient Theatre, a kind of pulpit, where the fingers, called thymelici, performed.

Thymelici, among the Romans, were musicians, who sung in the interludes, or who danced and kept time with their gestures. The place where they performed was called thyme, whence Juvenal, vi. 66.

"Attendit thymeæ, thymeæ nunc rustica dicat."
that the ancients used salutiferous as well as sweet-scented things in these fumigations. Galbanum has a worfe smell than ammoniacum, and yet this alfo we find, together with the myrrh, and other gums, is made an ingredient in the oldest preceptions of this kind.—And Pliny mentions the ammoniacum with the fexenanth, and other fweets, used for this purpofe.

**THYMIATUM**, in *Ancient Geography*, a country of Africa, in Libya, on the coaft of the Atlantic, according to the Peripius of Hannon.

**THYMIC**, in *Anatomy*, arteries, veins, &c. belonging to the thymus; see that article.

**THYMUS**, a wart or excrescence on the skin.

**THYMIAS**, in *Ancient Geography*, a gulf placed by Pliny on the coaft of the Doride, a province of Afa Minor. Here was a promontory of the fame name.

**THYMOSALME**, in the *Materia Medica of the Ancients*, was a compofition used externally in the gout, and many disorders of the limbs, and was given inwardly in diftemperatures of the flomach, a quarter of a pint for a dose. It operated as a purge, and was prepared in the following manner: take two ounces of broofed thyme, as much falt, a little meal, rue, and pencyroyal.—These were to be put into a pot, and three pints of water and fourteen ounces of vinegar are to be poured upon them; after which they are to be covered with a coafe cloth, and let in the fun for fome time. Diofcorides, lib. v. cap. 24.

**THYMUS**, in *Anatomy*, a glandular body, occupying the upper and anterior part of the cheft, and neighbouring portion of the neck, very large in the fucus, and diminished or nearly difappearing in the adult. The name is Greek, θυμος, which Pollux defines "caro famillis tonfille, prope cordis caput;" p. 258. The gland confines of two lobes, a right and left, which are elongated and conical, being broader below and narrow above: they are joined by cellular fubfance, which can easily be defroyed by dilfection, in their inferior two-thirds, but above they are separated by the intervention of the trachea. The thymus, indeed, may be defcribed as forming two elongated horns above, of which the right is fometimes longer than the left: it also forms two horns below; but they are shorter, thicker, and more obtufe. The principal body of the gland occupies the cavity of the mediastinum, or the interval between the right and left pleure, behind the upper part of the ferum. Here it is covered in front by that bone, on the fides by the pleure, and it refts behind on the front of the pericardium, of the aorta at its origin, and of the left fubclavieian vein. The inferior cornua reach to about the middle of the pericardium; and sometimes nearly to the diaphragm: the inferior run into the neck, on each fide of the trachea, between that tuba and the carotid, and reach the thyroid gland, or nearly fo.

The thymus is large in the fucus; nearly equal to the heart or one of the lungs. In a fucus of fix months, this gland was to the kidney as 4 to 6. It not only does not in-creafe after birth, but it becomes lefs, contains lefs fluid, is harder, and is nearly loft in the surrounding fat. In the mature fucus it weighed 160 and 180 grains; at twenty-eight years, 90 grains. In a calf it was 16 ounces; in a full-grown cow, 9 ounces.

In ftructure it reffembles the conglomerate glands: that is, it is composèd of innumerable small portions, united by cellular fubfance. By maceration there may be separated into smaller and smaller lobules. It is however fooner than the pancreas or salivary glands, and of a darker colour. When cut into, a copious white fluid may be fqueezed out from all parts of its texture. If air be impelled into it, the whole is reduced into a fpongy kind of fubfance.

No excretory duct has been discovered in the thymus; although anatomists have fancied that they had discovered passages from it to the oesophagus, trachea, pericardium, &c.

It has several arteries and veins: the former principally from the thyroid and mammary. The veins join the left fubcla-vian, or the jugular, and the internal mammary.

The nerves, if it has any, are extremely fmall twigs from the phrenic. Its absorbing vessels, which no doubt exift, are not much known.

It is of coniferable fize, even in the adult, in fome ani-mals, as the rat: the fame may be observed of the Arctic bear. It is large in fetaeous animals.

We know nothing of its office, nor why it is fo large in the fucus. There is not even a probable conjecture on the fubject.

**THYMUS**, a wary excrescence, especially about the anus or pudenda.


Gen. Ch. Cal. Perianth inferior, of one leaf, tubular, per-manent, divided nearly half way down into two lips, the mouth clofed with converging hairs; upper lip broaded, flat, erect, with three teeth; lower of two equal oval-shaped segments. Cor. of one petal, ringent; tube the length of the calyx, with a small throat; upper lip rather the shorter, flat, erect, emarginate, obtufe; lower longer and broader, spreading, in three obtufe lobes, of which the middle one is the broadest. Stam. Filaments four, incurved, two longer than the reft; anthers small, two-lobed. Pfl. Germen superior, deeply four-ecleft; ftyle thread-shaped; stigma divided, acute. Peric. none, the feds being concealed in the calyx, whose orifice is con-tracted and hairy. Seeds four, fmall, roundish.

Effi. Ch. Calyx two-lobbed, its mouth clofed with hair. Upper lip of the corolla flat, emarginate.

The trifling gener of old authors, made out of the pre-ent, though indicated by Linnæus, are not worth confidering. It is more defirable to define the limits of *Thymus* itself, which run very clofe upon thoce of *Melissa*; see that article, at the end of which this fubject is defcified. The number of species in Syn. Veg. ed. 14. are eleven; Will-deow has 22. We fhall find fome things among them to correct, and feveral new species to add. The habit of the whole is more or lefs shrubby, but their habit is humble, with spreading or diffuse branches. Root woody, generally per-ennial. Branches square. Leaves opposite, mostly entire. Flowers either whorled or capitate, purple or lilac; sometimes nearly white; never really blue, flaret or yellow. Whole plant abounding with pungent aromatic efential oil. This genus is about almost entirely European, and inhabits dry hilly situations, in the warmer or more temperate climes.


£ Ser-
THYMUS.


Flowers capitulate. Stems decumbent, creeping. Leaves flat, ovate, obtuse; fringed at the base.—Native of dry heaths and hillocks, as well as alpine pastures, throughout Europe, from Sweden to Greece, flowering all summer long. Its entangled branches form an eafy perennial turf, exhaling a warm aromatic odour when trodden upon, which varies in degree, and, in the well-known variety, affumes the grateful flavour of lemon-peel. The hoary or woolly variety we believe to be no more specifically distinct, notwithstanding Willdenow's remark, of its being unchanged by culture; for he does not mention having raised it from seed. The stems of Th. Serpyllum are wiry and flender, always wavy, never straight; their branches leafy and downy, ascending, each terminating in a little round head of numerous purple flowers, whose palate is variegated with white and crimson. Leaves dotted, strongly fringed at the base, are their footstalks throughout. Stipulae none. Bees frequent the flowers in great numbers. Hairy feelings, caused by an insect, are common on the young shoots. The seeds are rarely perfected.

2. Th. levigatus. Smooth Arabian Thyme. Vahl. Symb. v. 2. 65. Willd. n. 3. (Th. Serpyllum; Forsk. Egypt.-Arab. 107.)—"Flowers capitulate. Stems procumbent. Leaves linear, obtuse, sessile; contracted at the base."—Found by Forskall, on mount Chadra, in Arabia Felix. Stems thrubby, thread-shaped; smooth in the lower part, villous above, grey, with jointed annulated branches. Leaves half as long as the nail, very smooth, without ribs, dotted on both sides; fringed at the base. Head of flowers sessile, terminal, hemispherical, surmounted with numerous larger leaves. Calyx marked with elevated hairy lines; its teeth awl-shaped, fringed. Corolla rather hairy. Vahl.

3. Th. montana. Smooth Mountain Thyme. Waldst. et Kitaib. Hungar. v. 1. 72. t. 71. Willd. n. 13, excluding the rest of the synonyms, which belong to our Th. Serpyllum, var. 7. Ait. n. 7.—Flowers in elongated heads. Stem erect, branched. Leaves ovate, obtuse, flat, smooth and naked, entire.—Native of the Carpathian mountains. We received it from the Cambridge garden, in 1803. The root is perennial, with many long branching fibres. Stem a span high, bushy; the angles downy, with fine recurved hairs. Leaves silky, broadly ovate, slightly revolute; very smooth and even above; deficient of fringe at the base. Inflor 8escence like Th. Serpyllum, but rather more elongated, or spiky, and the flowers smaller, with a much less hairy, though not smooth, calyx, the hairs of whose orifice are scarcely prominent at all, by no means to conspicuous as in the Serpyllum.

4. Th. nummularius. Money-wort Thyme. Marsh. a Bieberit. Taur. v. 2. 58.—Flowers capitulate. Stems decumbent, creeping, hairy. Leaves roundish-ovate, flat, obtuse; somewhat fringed at the base and midrib.—Native of mount Caucasus. We received wild specimens from Dr. Fischer. This has a very different aspect from Th. Serpyllum, on account of its almost orbicular leaves, and the hemispherical leafy heads of flowers. Every part moreover is three or four times the size of that common species. The joints of the stem are remarkably villous in their upper part, especially near the flowers. Sometimes, it is said, the whole plant is densely hairy.

5. Th. Marchalianus. Buxby Taurian Thyme. Willd. n. 8. Marchal. a Bieberit. Taur. v. 2. 59.—Flowers in elongated heads. Stem thrubby; its flowering branches erect. Leaves linear-lanceolate, bluntish, flat, somewhat triple-ribbed; fringed at the base. Frequent in dry grassy hilly places, about mount Caucasus, flowering from May to August. This seems from the description more akin to Th. Serpyllum than to Th. Zygis, for which latter it was taken by Pallas. The stem is procumbent, fending up numerous simple flowering-branches, fix inches high, downy in the upper part. Leaves eight inches long, one and a half broad, on very short stalks. Calyx hairy, fringed. It varies with leaves but half as broad.

6. Th. vulgaris. Common Garden Thyme. Linn. Sp. Pl. 825. Willd. n. 4. Ait. n. 2. Woodv. Med. Bot. t. 109. (Thymum durtius; Ger. Em. 573.)—Stem thrubby, much branched, erect. Leaves ovate, revolute. Whors crowded into leafy spikes.—Found on stony hills in Spain, Portugal, the south of France, Greece, and the Archipelago. Common in gardens, flowering during summer. The stem is bushy, woody and rigid. Leaves a quarter of an inch long, various in breadth, downy, of a greyish hue, numerous, with little axillary tufts of smaller ones. Flowers small, light purple, in hairy heads, or short spikes, with two or three remote whors beneath. Calyx-teeth strongly fringed. This has usually a warm pungent flavour, like Winter Savory; but there is a sweet-scented variety, called Frankincense-Thyme, differing in no other respect from the common sort, which is commonly cultivated in Norfolk, and highly grateful to most people. The thymus: of Dicoresides is not, as Bauhin supposed, this plant, but Satureja capitata.


9. Th. Zygis. White Spanish Thyme. Linn. Sp. Pl. 826. Mant. 413. Willd. n. 7. Ait. n. 3. Sm. Pl. Græc. Sibth. t. 574, unpublished. (Thymum angustifolium longiroque folio; Barrell. Lc. t. 777. Serpyllum sylvestre, Zygis Dioecoris; Clus. Hift. v. 1. 358. S. erectum; Ger. Em. 571.)—Stem thrubby, ascending. Leaves linear-lanceolate, obtuse, revolute; tapering and fringed at the base. Whors crowded into leafy spikes.—Native of Spain and the Levant. Dr. Sibthorp gathered it on hills about Athens and Constantinople. Mr. Malcolm is said in Hort. Kew. to have had the plant in his garden in 1771. Linnæus cultivated it at Uplif. The root is woody and perennial. Stems numerous, from four to six inches long, leafy, round, finely downy,
downy, reddish, slightly branched, spreading on the ground before flowering, then ascending. Leaves three-quarters of an inch long, numerous, crowded, spreading, very minutely and densely downy, copiously dotted; ribbed and rather paler beneath; tapering into a short, broad, downy footstalk, coarsely fringed like the base of the leaf itself. Flowers in leafy heads, often with an axillary whorl below. Calyx clothed with recurved hairs; all its teeth tapering and parallel, strongly fringed. Corolla white, with red dots on the palate. Anthers reddish, prominent. Professor Sibthorp adopted the opinion of the old authors, that this might perhaps be the _Thymus alpinus_ of Dioscorides. Its application in modern Greek is _Thymus_, which, if we mistake not, means "the delight of bees."

10. _Th. Ainos._ Basil Thyme. Linn. Sp. Pl. 826. Willd. n. 10. Fl. Brit. n. 2. Engl. Bot. t. 411. Curt. Lond. f. 1. t. 43. (Acinos; Rivin. Monop. Irr. t. 43. f. 2. Ocyamus fylvestre; Ger. Em. 675.)—Flowers on simple footstalks, about fix in a whorl. Stem herbaceous, ascending, branched. Leaves acute, serrate. _Calyx_ gibbous at the base. Native of dry gravelly or chalky pastures, fallow fields, &c. throughout Europe, nor rare in England, flowering from July to September. The _root_ is annual, of a few slender fibres. _Stems_ clothed with recurved hairs, reddish, lax and spreading, hardly a span long; their flower ultimate branches erect. _Leaves_ on short foot-stalks, small, ovate, varying to roundish or oblong, but always acute, more or less deeply and coarsely serrated, rarely quite entire, veiny, hairy; the upper ones tapering much at the base. _Flowers_ light violet; their palate white, with dark purple spots. _Stamens_ short. _Calyx_ deeply furrowed, hairy, fringed, swelling underneath, as is the calix, more or less, with all the species to which this is allied. The herb is rather slightly aromatic, not pungently so.

11. _Th. fruticosus._ Penny-royal-leaved Thyme. Prodr. Fl. Græc. n. 1400. (Chinopodium minus angustifolium, pulegii odor, romanum; Bocc. Muf. v. 1. 50—54. t. 45. A.)—Flowers whorled. _Leaves_ lanceolate-elliptical, pointed, somewhat serrated, hairy. _Stems_ shrubby.—Native of Italy and Greece. _The flāms_ is a foot high, bushy; the branches leafy, rough, with recurved hairs. _Leaves_ with their flāms about an inch long, rigid, ribbed, bristly, often quite entire. _Flowers_ fix or eight in a whorl, on simple flāms. _Calyx_ like the leaf, but longer and more slender. The whole plant smells powerfully of Penny-royal, even after having been dried thirty years. On this subject _Boccone_ has treated us with a long disquisition, quite in the Italian fyle, in which the facts are better than the philosopgy, though some of them want confirmation. He attributes the above scent to particles of sulphur and bitumen communicated by the soil.

12. _Th. patavina._ Marjoram-leaved Thyme. Jacq. Obs. f. 4. t. 87. Willd. n. 11. Ait. n. 5. (Chinopodium perennium, pulegii odor, majorana folio, patavinum; Bocc. Muf. v. 1. 60. t. 45. B.)—Flowers whorled. Leaves ovate, with copious shallow ferratures, slightly hairy. _Stems_ shrubby.—Native probably of the south of Europe, though no botanist who has described this species seems to have known it but from gardens. Hence even its name originated, which is therefore liable to great exception. _Willdenow_ appears to have seen no specimen. The specific character taken by him from the first edition of Hort. Kew. of "the inflated throat of the corolla, extending beyond the calyx," is not in the leaf degree peculiar. Nevertheless, authentic specimens of the plant prove it distinct from the foregoing and the following, in the broad-ovate, almost heart-shaped, figure of the rather fleshy _leaves_, their even surface, and numerous, minute, shallow ferratures. They much resemble some kinds of _Ocimum_, and like those are sometimes concave.

13. _Th. alpinus._ Alpine Thyme. Linn. Sp. Pl. 826. Willd. n. 12. Ait. n. 6. Jacq. Aufr. t. 97. (Chinopodium montanum; Bawh. Pin. 225. Bocc. Muf. v. 1. t. 45. C. C. australicum; Chuf. Pann. 621, 623. Hilt. v. 1. t. 353. Ger. Em. 676.)—Flowers on simple footstalks, about fix in a whorl. Stem herbaceous, ascending, branched at the bottom. Leaves ovate or roundish, bluntish, coarsely serrate. _Calyx_ gibbous at the base.—Native of the lofty mountains of Austria, Switzerland, Italy, and Crete, as well as of the Eichymian Olympus. Nothing is more difficult than to define the difference between this and our _Th. Ainos_, except that the _alpinus_ is in every part larger and more handsome, with a strong reinous scent. The root is either biennial, or perennial, we are not certain which. The _leaves_ are too entire in the cut of Chelius and Gerarde.

14. _Th. exigius._ Small Cyprian Thyme. Sm. Prodr. Fl. Græc. Sibth. n. 1402. Fl. Græc. t. 575. unpublished. _—Flowers very few in a whorl. Leaves rhomboid, pointed, oblique, nearly entire. Stems branched at the base. Tube of the corolla thread-shaped.—Discovered by Dr. Sibthorp in hilly situations in the isle of Cyprus. The root is annual, simple, fibrous. _Stems_ two or three inches high, erect, with leafy hairy branches from the bottom. _Leaves_ one-third of an inch long, smoothish, on long hairy flāms. _Flowers_ either two or four in each whorl, on thick flāms. _Calyx_ slender, furrowed, hairy. _Corolla_ with a very slender white tube, enclosing the _flāmens_, and short, rounded, pale-purple segments in the limb.

15. _Th. pulegiodes._ Penny-royal-leaved Thyme. Linn. Sp. Pl. ed. 1. 592. Sm. Prodr. Fl. Græc. Sibth. n. 1597. (Cunila thymodes; Linn. Sp. Pl. ed. 2. 31. Willd. Sp. Pl. v. 1. 123. Acinos thymi folio annuo, floribus in/exanips; Morif. f. 11. t. 16. f. 6.)—_Whorlsm_ many-flowered, crowded into long, dense leafy spikes. _Leaves_ ovate, obtuse, entire. _Stems_ herbaceous, branched, with four hairy angles.—Native of the south of France, and of hills in Greece. _Root_ fibrous, marked as annual by _Linnaeus_, but the _leaves_ have a thrubby appearance. They are a span high, with opposite branches, leafy, their angles densely clothed with recurved hairs. _Leaves_ falked, from a quarter to half an inch long, deflexed, dotted, smooth, except a few occasional coarle marginal hairs. _Flowers_ on longish, cylindrical, densely downy flāms, ten or twelve in each whorl. _Calyx_ strongly furrowed, hairy, with a broad upper lip, and two long, narrow, fringed teeth in the lower one; the orifice densely hairy. _Corolla_ small; its limb seems to resembbe the falt-described. Sometimes the _flēms_ is clothed with whorls of _flowers_ almost from the bottom to the top, and the upper _leaves_ are larger than the lower. The odour of the plant is that of Thyme, not of Penny-royal.

16. _Th. graveolens._ Strong-scented Greek Thyme. Sm. Prodr. Fl. Græc. Sibth. n. 1403. Fl. Græc. t. 576. unpublished. _—Whorls_ barely fix-flowered. _Leaves_ ovate, rhomboid, obtuse, revolute, somewhat ferrature. Stems much branched, shrubby.—Gathered on mount Parnassus, by Dr. Sibthorp, who supposite it might be the _Thymus_ of Dioscorides, and from whole manuscripts we have adopted the specific name. The strong, woody, branching _root_ bears a tuft of numerous ascending, branched, leafy, reddish, downy _flēms_, about fix inches high. _Leaves_ dark green, paler beneath, smooth, a quarter of an inch long, on foot-flāms of nearly their own length. _Flowers_ on fimple flāms, with a pair of small oval _bractes_ at the base of each flāk, usally
Native of the Balearic islands. Introduced into our greenhouses in 1770, by Mr. Malcolm. The root is perennial, woody. Stems from four to six inches long, trailing, purplish, slightly branched. Leaves flabellate, agreeing with those of n. 17, in their timid margin, but not half so large, and more pointed. Flowers very small. Calyx ovate, narrowed; its three upper teeth broadest and shortest; lower ones fringed.

21. Th. incanus. Hoary Calaminth Thyme. Sm. Prodr. Fl. Græc. Sibth. n. 1405. Fl. Græc. t. 577, unpublished. (Calaminthar orientalis annua, oocym folio, flore minimo; Tour. Cor. 12, by the character.) —Whorls simply flabellate, of about six flowers. Leaves roundish, entire, clothed with hoary down. Beard of the calyx concealed. Stems procumbent. —Common in the islands of the Archipelago, and about Athens. The root is woody, and but for Tournéfort’s synonym, we should judge it perennial. Stems herbaeaceous, numerous, diffuse, a foot long, with opposite leafy branches, clothed, like every part of the herbage, with fine, soft, grey pubescence. Leaves flabellate, convex, ribbed, rounded and blunt, half an inch in diameter. Flowers scarcely projecting beyond the leaves, on simple hairy flanks. Calyx ovate, tumid, ribbed; with lips of equal length; the upper broad, abrupt, three-toothed; converging hairs of the throat concealed in the tube. Upper lip of the corolla pink, hairy; lower white; palate dotted with red.

22. Th. grandiflorus. Large-flowered Calaminth Thyme. Sims in Curt. Mssg. t. 997. (Th. carolinianus; Michaux Boreal-Amer. v. 2. 9. Calamintha grandiflora; Pursh. 414.) —Whorls simply flabellate, of about ten flowers. Leaves ovate, ferrated, nearly smooth. Beard of the calyx concealed. Stems erect, thorny. —On the banks of the river Savannah, in Georgia and Carolina, flowering in July and August. Pursh. Cultivated by John Walker, elq. at Southgate, about 1804. The root is perennial. Stems bushy, with opposite branches, a foot or more in height. Leaves flabellate, deflexed, above an inch long, green, somewhat downy to the touch only. Flowers large, pale purple, with a vaulted upper lip, and a dotted palate. Upper lip of the calyx very broad.


usually three or four in a whorl, sometimes five or six. Calyx with a shortish furrowed tube, very gibbous at the base beneath; its upper lip broad; lower of two awl-shaped fringed teeth; both tinged with red. Corolla of a purplish crimson, large and handome, downy in the mouth, as well as at the back, which latter is the case with Achinos, alpinus, and all of the same tribe.

17. Th. marginatus. Thick-edged Thyme. Sm. in Dickf. Dr. Pl. n. 71. (Th. Piparella; Allion. Pedem. v. 1. t. 37. f. 3, excluding the synonyms.) —Stalks many-flowered, lateral and terminal. Leaves ovate, nearly smooth, ribbed, entire, with a thick cartilaginous margin. Calyx-teeth nearly equal. Stems shrubby, ascending. —On the rocks of the maritime alps of Piedmont very abundantly. Allioni. Of more humble stature than the last, with many round, slender, downy, purplish, ascending stems, about a finger’s length, branched at the base only. Leaves nearly scifice, inclining to heart-shaped, covered with retinous dots, sometimes slightly downy, remarkable for their thick, smooth, pale margin. Flower-flanks chiefly axillary, about as long as the leaves, somewhat corymbose, downy, bearing several small ovate bracteas, and three or four flowers. Calyx cylindric, furrowed; all its segments awl-shaped, and not very unequal, none of them fringed. Corolla with a slender hairy tube, twice as long as the calyx, and a short rounded limb. The whole plant is warm and pungent, highly aromatic. It is very distinct from the following.

18. Th. Piparella. Pepper Thyme. Linn. Syll. Nat. ed. 12. v. 2. 400. Willd. n. 14, excluding the synonym of Allioni, and possibly those of Vahl and Forrill. (Marum hispanicum nigrum, flore purpureo, Piparella hisp.) —Stalks many-flowered, lateral. Leaves ovate, somewhat heart-shaped, obtuse, entire, smooth, strongly ribbed, copiously dotted. Upper lip of the calyx very broad; lower fringed. —Native of Spain. The root is perennial. Stems apparently trailing, a span long, branched, bluntly quadangular, finely downy. Leaves varying in size, but scarcely more than a quarter of an inch long at the root, thick, flat, without any cartilaginous edges, their ribs numerous, parallel and strong. Flower-flanks short, downy. Flowers in axillary, corymbose, downy, leafy tufts, with ovate bracteas. Upper lip of the calyx remarkably broad, and rather the longest, covered with retinous dots; lower strongly fringed. Corolla a little longer than the calyx, pale, dotted with retinous points. The odour of the plant is most like Th. Serpyllum. Vahl speaks of a border to the leaves, which induces a fupicion that he took out marginatus for Piparella.


THYMUS.

August. The habit of this species is like the last, but
with smaller leaves, more conspicuous longer-stalked flowers,
and less upright stems. Its scent is different, and much
stronger, resembling Penny-royal.

" Hoffm. et Link Luft. v. 1. t. 127. t. 13." (Tragori-
ganum dictauni capite, hispanicum; Barcel. Lc. t. 778.
Docq. Mif. 50. t. 43.)—"Heads of flowers with closely
imbricated, large, coloured bracteas, delittute of dots.
Leaves linear, entire.—Native of Spain and Portugal. A
thubby bushy plant, with purplish flowers, and downy branches.
Leaves fringed at the base. Flowers concealed by the
large purplish bractea, forming an ovate head. Upper lip
of the calyx rather the longest; lower fringed. We have
seen no specimen, either of this or the next.

Symb. v. 3. 78. Willd. n. 18.—"Heads of flowers with
closely imbricated, ovate, liriated, dotted bracteas.
Leaves linear-lanceolate, ferrated, dotted in the margin."—Found
by Cyrillo, in the kingdom of Naples. The flerns are shorter
and more upright than the foregoing; not branched in their
upper part. Leaves broader, erect; liriated at the back.
Heads smaller, with smaller green bractea. Vahl.

128. t. 14." Sm. Pl. Græc. Sibth. t. 578, unpubl.-
Heads of flowers with imbricated, fringed, lanceolate,
ternate, keeled bracteas. Leaves lanceolate, hairy, acute.
Stems trailing.—Native of Portugal, Cyprus, and the
carphelago. The strong woody root tends out numerous,
decumbent, branched, thurby flerns, which compose ample
tufts, taking root as they spread, with short, simple, ascen-
ding flowering branches. Leaves clustered, nearly awl-shaped,
dark green, fringed with coarse white hairs. Bracteas
and calyx tinged with a violet purple; the upper lip of the latter
oval, with three sharp teeth. Corolla rose-coloured, with a
flender hairy tube, twice the length of the calyx. Stamens
prominent.

827. Willd. n. 20. Ait. n. 11. (Marum; Rivin. Monop.
rr. t. 49. Ger. Em. 670.)—Whorls flaked, many-flower-
ced, crowded into round heads. Leaves ovate, obtuse,
entire. Calyx-teeth awl-shoulded, taper-pointed, all fringed,
nearly uniform.—Native of woody ground in Spain and
Greece. Dr. Shibthor gathered it on mount Hymetus,
near Athens, fo famous for honey. This plant has been
treasured up in many a rutile garden, or cottage window,
ever since the days of old Gerarde; but will larcely bear
our winters unprotected, for any length of time. It
flowers throughout the latter part of summer. The figure of
Rinvin is cited by milfack, in the usually accurate Hort.
Kew. for Teucrium Marum. The flern of the present species
is thrabby, twelve or eighteen inches high, erect and bulky,
with many roundish, downy, leafy branches. Leaves nu-
erous, flaked, about the size and shape of Th. Scopulum,
but thicker, finer downy, and not fringed at the base;
mott borazy beneath. Flowers white, small, conspicuous for
the long slender teeth of the calyx, which are pectinated
with abundance of long brillock hairs. The tube is closed
with copious white hairs, nor can we see any foundation
for Linnæus's doubts, whether this plant should be referred
to Thymus or Satureja, except the calyx-teeth being nearly
equal, which is the cafe, more or less, with some of the
foregoing. The odor of Th. Maftichina is pleasantly aro-
matic, not very pungent.

Vol. XXXV.

Widtt. n. 21. Ait. n. 13. Turr. Farct. 11. (Tragori-
ganum magus; Alpin. Exot. 79. t. 78. T. fecunda, altera
species; Chit. Hift. v. 1. 555. T. cretenf; Gen. Em.
608.)—"Stem somewhat thurby, erect. Flowers whorled.
Leaves liripaid, pointed."—Native of hills in Crete; as well
of Cyprus and Beoetia, according to Dr. Sibthorps's manu-
scripts, though his herbarium contains no specimen. Neither
does that of Linnæus, whose specific character we are
obliged to copy. He describes it as a sweet-scented plant,
with hairy flerns, a foot high; leaves rather rigid, pointed
at each end. The root appears to be woody and perennial.
It is curious, numerous, dense, of many flowers.

For Th. virginicus, Willd. n. 22, see PYCNANTHUM,
no. 5. The same author has a Th. inodorus, n. 9, adopted
from Desfont. Atlant. v. 2. 51. t. 129. A specimen ap-
parently anwering to this, gathered by Thunberg at the
Cape of Good Hope, is preferred in the Linnean herbarium,
with a note at the back advertting to the singularity of a
plant of the Didynamia Gymnopsomia having alternate
leaves; and it is named Satureja alternifolia. We do not
find that either Linnæus or Thunberg ever published this
plant; possibly because of the uncertainty of its genus; or
it may be among those which the latter has referred in his
Prodromus zu Sicilia, several of which we have no means of
determining. Whether the plant of Desfontaines be the
name or no, we dare not, without examination, confider it as
a Thymus, though he describes the calyx as closed with
hairs, which is certainly not the case with Thunberg's specimen.

Thymus, in Gardening, contains plants of the low, aromatic,
perennial kind; among which the species cultivated are
the wild thyme (T. pcrpillum); the garden thyme (T.
varigala); the maftick thyme (T. maftichina); and the
Virginian or favory thyme (T. virginicus).

In the first fort there are several varieties; as the broad-
leaved, the narrow-leaved, the variegated-leaved, the silver-
striped-leaved, the cliron-scented or lemon thyme, and the
great purple-flowered.

And in the common fort there are different varieties; as the
broad-leaved, the narrow-leaved, and the variegated or
fringed-leaved thyme.

Method of Culture.—These plants may be easily raised
from seed, by flooding the roots and branches, and by cut-
tings; but the seed method is seldom practised, except with
the second fort, or garden thyme. The feed should be
fown in the early spring on light, rich, dry ground, which
should be properly dug over, and the surface be made mo-
derately smooth with the spade. As the feed is small, it
should not be fown too thick, or be covered too deep: the
feed is best fown while the ground is fresh firmed, either
broad-call on the surface, raking it in lightly, or in flat
shallow drills, earthed over thinly: the plants appear in two
or three weeks. It is necessary to be careful to keep them
well weeded, giving occasional light waterings in dry
weather; and by June they will require thinning, especially
if the plants are to grow focky, and with buffy full heads;
in which case they should be let out to fix or eight inches
distance; when those thinned out may be planted in another
place, in rows fix or eight inches alonder, giving water till
fresh rooted, keeping the whole clean from weeds by occa-
sional hoeing between them in dry days, which will also fit
the surface of the earth, and much improve the growth of
the plants: they will be in perfection for use in flower, or
early in autumn.

Sometimes the market kitchen-gardeners raise large quan-
tities in beds, for daily supply, leaving the whole thick:
Some is and people accordingly and place. Some is and fibres. Some is and place, fame variety. The thyme in the garden is used for cuttings in order to form small, fresh, and fragrant plants, which are planted in beds of good earth, in rows half a foot in diameter, giving water directly, and repeating it occasionally in dry weather till they have taken root, and begin to shoot at top; they soon grow, and form good bushy plants in two or three months.

The strong slips of the branches without roots, succeeded in the early spring season in a shady border, in rows four or five inches distant, giving due waterings; and before the plants were in full leaf, and being now divided into separate parts, are put into small, with roots to each, and planted in the beds of the garden, and by taking up the old plants in the autumn, and cutting or dividing them into separate parts, the plants multiply exceedingly. Some plants, however, become rooted from cuttings as master, as being able to form a better and more uniform quality than those cut in the spring.

When planted in any particular varieties, in the best Lewis certainty, it can only be effected by leaf and cutting. The leaves and slips, all the slips multiply by leaf and slipping, and the latter by the old plants. In order to form slips, the plants are set out of the soil in pots, half a foot apart, by taking up the old plants in the spring, and cutting or dividing them into separate parts, and planting them in the beds of the garden, and by taking up the old plants in the autumn, and cutting or dividing them into separate parts, the plants multiply exceedingly. Some plants, however, become rooted from cuttings as master, as being able to form a better and more uniform quality than those cut in the spring.

The thyme being in universal use as a pot-herb for various culinary purposes, it also is employed in the garden for the same purposes, as also in the kitchen garden, in which it is often potted, or placed in small, with roots to each, in the beds of the garden, and by taking up the old plants in the autumn, and cutting or dividing them into separate parts, the plants multiply exceedingly. Some plants, however, become rooted from cuttings as master, as being able to form a better and more uniform quality than those cut in the spring.

The thyme is in universal use as a pot-herb for various culinary purposes; it also is employed in the garden for the same purposes, as also in the kitchen garden, in which it is often potted, or placed in small, with roots to each, in the beds of the garden, and by taking up the old plants in the autumn, and cutting or dividing them into separate parts, the plants multiply exceedingly. Some plants, however, become rooted from cuttings as master, as being able to form a better and more uniform quality than those cut in the spring.

The common thyme is in universal use as a pot-herb for various culinary purposes; it also is employed in the garden for the same purposes, as also in the kitchen garden, in which it is often potted, or placed in small, with roots to each, in the beds of the garden, and by taking up the old plants in the autumn, and cutting or dividing them into separate parts, the plants multiply exceedingly. Some plants, however, become rooted from cuttings as master, as being able to form a better and more uniform quality than those cut in the spring.
Allo, a place situate on the coast of the Peloponnesus. According to Herodotus, the inhabitants of Hermione gave it to those of Samos.

**THYREUM**, a small town of Arcadia, S. of Megapolis. It was deferted in the time of Paulaniers.

**THYRIDES**, a town of Laconia, S.E. of Messa. Near this place were the ruins of the town of Hippola, in the midst of which was seen, in the time of Paulaniers, a chapel of Minerva Hippoloparias.—Allo, the name of the summit of Tymnus, in the Peloponnesus; 30 stadia from the promontory Tymnus. Phiny gives the name of Thyrides to three islands of the Gulf of Africa.

**THYROID**, in Anatomy, thyroidus, or more properly thyreoideus, from *thyros*, a shield, and *oidos*, form; a name given to one of the cartilages of the larynx (see LARYNX), to a gland situated near that cartilage (see LARYNX), and to the arteries and veins of the gland. See *Artery* and *Vein*.

**THYROID Gland, Diseased.** See *Bronchocele*.

**THYROID Gland, Extirpation of.** It cannot be doubted that this operation is one of the most difficult and dangerous in the practice of surgery; and it ought never to be undertaken, except under the most urgent circumstances, and by operators of connunicate skill and judgment. Were a surgeon, superficially acquainted with anatomy, and little accustomed to attempts of so bold a kind, to undertake the operation of cutting away a diseased thyroid gland, he would run the utmost risk of seeing the patient bleed to death under his hands.

The following is a memorable instance of the successful performance of this operation. In the year 1784, J. Hyons, twenty years of age, experienced an acute pain at the middle and anterior part of the neck, in consequence of a violent extension of the head. This pain, which was only momentary, was followed by some difficulty of motion. About three months afterwards, a small, hard, indolent tumour appeared on the right side of the trachea. The swelling was unattended with pain, or alteration in the colour of the integuments. The tumour seemed to be raised by a pulsatary action, which tended to prove the existence of a large artery underneath, and, in fact, its base was situated on the general course of the carotid artery. The patient feeling no inconvenience, neglected it until June 1788. At this time it was an inch in diameter. Its progress, which in the first instance was slow, now augmented with proportionable rapidity. Internal remedies and topical applications had no effect in preventing its increase. A fluctuation in its centre was soon evident: an incision was then made into this part, and a quantity of yellow serosity discharged. Three months after this operation, which was not of the least service, recourse was had to cauteries, which were repeatedly applied without any advantage. On the 20th of March 1791, she presented herself for admission at the Hôtel-Dieu. At this period the tumour was two inches in diameter, round, hard, and attached to the right and middle part of the trachea; and it pushed outwards the laryngo-mastoideus muscle. Independently of its being sufficiently raised by each pulsation of the arteries, it obeyed the motions of deglutition, and in a slight degree impended the passage of the food aliment. The patient, ill defined the desire of its convenient disposition, determined to submit to its extirpation, which appeared her only resource. The danger, the length of time, and the pain necessarily annexed to the operation, were not concealed from her. The operation, after a few days previous preparation, was performed in the amphitheatre by Defart in the following manner: the patient being laid on her back, a little inclined on the left side, with the head and neck more raised than the rest of the body, the surgeon made a longitudinal incision through the middle of the tumour, beginning one inch above, and finishing one inch below, to allow room to finish the operation with ease: in the first section he cut down as far as the gland, dividing the integuments, the platyma-myoidei, and some fibres of the laryngo-hyoidei and laryngo-thyroidei muscles: an assistant, with the view of fixing the tumour, drew towards the left the inside edge of the wound made by the incision, whilst the surgeon detached it from the laryngo-mastoideus muscle. In dissecting the cellular substance which united the parts, two small arteries were divided, which were raised by a pair of dissecting forceps and secured by ligatures. The external surface of the tumour being thus diffigaged, the internal part was detached in the same way. The tumour was drawn outwards by a means of a hook, that it might be separated with more ease from the anterior part and from the side of the trachea. In the course of this dissection, the branches of the thyroid arteries were successively tied, as fast as they were divided. The assistant, to whom the hook was confided, directed the gland from within and forwards, whilst the surgeon finished the dissection outwards and from above downwards. This part of the operation was the most minute and difficult; it was necessary by means of a sponge continually to wipe away the blood, which necessarily prevented the parts from being easily distinguished, and obliged the surgeon to divide but a little at a time, and previously to feel with his finger those parts he was about to incise. By this cautious dissection of parts, the superior and inferior thyroid arteries were laid bare, and afterwards secured by ligature by means of a blunt crooked needle. They were afterwards transected, divided, and the remaining part of the tumour detached from the trachea, to which it strongly adhered. The wound resulting from this operation was near three inches in depth; it was outwardly bounded by the laryngo-mastoideus muscle, and inwardly by the trachea and oesophagus; posteriorly by the carotid artery, and by the nerves of the eighth pair, which were exposed at the bottom of the wound. After the wound was well washed with warm water, and cleared from the blood, it was filled with coarse lint, powdered with colophony; square comproffes, secured by a bandage moderately tight, formed the rest of the dressing. The extirpated tumour was five inches in circumference; and on examination was found to differ in no particular from fibrous glands, except that in the centre there was a cartilaginous nucius. The patient supported this long, difficult, and painful operation with uncommon firmness: the puffed the rest of the day without experiencing any other symptom than a slight swelling, generally consequent to large wounds. The following night she complained of a sense of heat in the neck, and some difficulty in deglutition. The next day a little cold was obtained by moistening the dressing with a decoction of marshmallows. A weak drink of the herb dog’s-tooth, acidulated with oxymel, was preferred. On the third day the fever was very moderate, but the difficulty in swallowing had considerably increased at this period; the comproffes and the external lint were removed, and fresh applied. On the fourth, the fever ceased, and deglutition became less painful. Suppression now became established. The next day all the lint was detached, and the whole of the dressings renewed. The wound was in a good state; it was dressed with warm lint and comproffes moistened with an emollient decoction; a practice which was continued for the following days. No particular circumstance occurred during the cure. The wound followed the ordinary pro-
grew, and was cicatrized at the end of a mouth. The patient left the hospital, perfectly cured, the 34th day after the operation. See Defaut’s Parisian Chirurgical Journal, vol. ii. p. 292—296.

To the preceding case, the editor of the above work has annexed the few following reflections.

The extirpation of the thyroid gland is an operation extremely difficult, and certainly highly dangerous, when performed by an operator but moderately exercised in the practice of his profession. The number and size of the arteries necessary to divide, the proximity of the trachea, celiacus, and carotid, near which the knife must necessarily pass, are the principal dangers that the operator should avoid. These are the circumstances which have deterred the majority of practitioners from performing it, particularly those who from long established prejudice have been deterred from using ligatures in cases of wounded arteries. Examples of this operation are very rare. The first time that Gooch undertook to perform it, he was deterred from finishing it by the hemorrhage, and his patient died on the eighth day. The second time he succeeded better, but was incapable of curing the veins, and succeeded in flopping the hemorrhage, which would otherwise have been mortal, by cutting the parts to be compressed by the hand of an assistant for the space of eight days. Gooch’s Med. and Chir. Obf. p. 130.


A. F. Vogel and Theden have practised the same operation with the most complete success. All danger from the hemorrhage, or inconvenience arising from the discharge of blood, may be obviated by pinching up the small veins, tying them as fast as they are divided, and by discovering and tying the large vessels previous to their division; other parts that cannot be wounded without danger, are to be avoided by dissection slowly and a little at a time, and feeling with the finger every part previous to its division with the hilory.

THYRO-ARYTENOIDEUS, a muscle of the larynx. See LARYNX.

THYRO-EPICLOTTICUS, a tappused muscle of the larynx. See LARYNX.

THYRO-HYOIDUS, a muscle passing between the os hyoideus and the thyroid cartilage. See LARYNX.

THYRO-PARYNGEUS, a portion of the inferior constrictor of the pharynx. See Description.

THYROIDEÆ Glândule Majuscula. See the description of the thyroid gland in the article LARYNX.

THYRÆUM VITISUM, a fort of wine among the ancients, remarkable for its thickness and dark colour; it was sweet and delicious, and not astringent.

THYRÆUS LAPIS, in Natural History, the name of a fossil, which the writers of the middle ages have called syrah.

It has many virtues ascribed to it; but all the accounts we have of its real properties are from Pliny, who observes, that it swam upon the water while whole; but when broken into small pieces, these sunk to the bottom. It seems to have been a fort of bitumen of a spongy structure.


THYSUS, Oregis, in Antiquity, the sceptre which the ancient poets put in the hands of Bacchus, and with which they furnished the Muses in their Bacchanalia.

The thyrus was originally a lance or spear, wrapped up in vine leaves; with which Bacchus is said to have armed himself and his soldiers in his Indian wars, to amuse and deceive the unpractised Indians, and make them suspect no boflullies.

Hence it was afterwards borne in the feast and sacrifices of that god; and as the Satyrs, who were Bacchus’s followers, were supposed to have fought with it, it became a custom to represent them therewith.

THYSUS, Orlyagnn, in Ancient Geography, a river of the isle of Sardinia, which ran from N. to S. and discharged itself towards the W. into the sea.

THYSUS, in Botany, a Bunch, is a mode of inflorescence, nearly allied to a Racemus, or Clatter, except being compound, in which it agrees with a Panicle. Its form is more or less ovate, and the disposition of the branches and subdivisions is either opposite or alternate; the ultimate one sometimes obscurely umbellate. Examples are found in the Lilac, Syringa vulgaris, and a bunch of Grapes, Ægis vinifera; as well as in the herbaceous plants Tussilago hybrida and Potentilla. Hence it appears that a Thyrus is nothing more than a dense or close Panicle; and in the examples last cited, this mode of inflorescence actually becomes a loose panicle, as the plant perfects its seed. See PANCULA and INFLORESCENCE.

THYSANTHUS, Ægis, fringed, a very descriptive name of Mr. Brown’s, which he applies to his plant, Mr. Salisbury for having knowingly suppressed.—Brown Prodr. Nov. Holl. v. 1. 282. (Chlamysporum; Salis. Parad. 103.)—Clafs and order, Hexandria Monogyne. Nat. Ord. Coronaria, Linn. Aphiobole, Jull.

Gen. Ch. Cal. nom. Gen. inferior, of one petal, in petioles spreading, permanent segments; the three inner ones broadest, fringed at the edges with jointed hairs; the three outermost externally of the texture of a calyx. Stom Filaments six, awl-shaped, smooth, much shorter than the calyx, inserted into its base; anthers linear, incumbent, attached by the funis at their base, a little unequal at the end, the three outer ones generally elongated and reclining. Pet. Germen superior, roundish; style thread-shaped, dehiscing, about the length of the stamens; stigma simple. Peric. Capsule oval, of three cells and three valves, with a partition from the centre of each, enveloped in the withered corolla. Seeds two in each cell, one erect, the other pendulous, roundish, somewhat flattened, inserted into a cup-shaped white appendage; albumen dense, fleshy.

Obs. A few species have only three stamens.


A rather numerous genus of perennial herbaceous plants, natives of different parts of New Holland. The root is either fibrous, or confis of clotted fleshy bulbs. Stem generally branched and leafy. Leaves lance, narrow, often channelled, sometimes thread-shaped, or shortened. Flowers terminal, umbellate; rarely scattered; their stalks jointed in the middle. Corolla blue within; three, at leaf, of its segments green at the back. Anthers purple; the outer ones sometimes whitish, which in the triandrous species are wanting. Seeds black. The permanent corolla, and smooth filaments, principally distinguish this genus from Mr. Brown’s Arthrophorum, Prodr. Nov. Holl. v. 1. 276, by which it is related to the Linnean Anthericum. The learned author whom we follow defines twenty-one species, of which he seems doubtful whether any one has ever been introduced into the English gardens, at least so as to bear flowers; for he thinks the figure in Parad. Lond. was done from
from a dried specimen. On this subject we have no particular information. Several drawings of this genus and its allies, made in New Holland, have passed under our inspection, and display a degree of elegance which renders the plants highly desirable.

Of the twenty-one species, seventeen are hexandrous, four triandrous.

Sec. 1. Stamen six.

Th. tuberosus. Tuberous Fringe-blossom. Br. n. 1.—

"Bulbs falcately, filiform, marked. Radical leaves channelled, lax, smooth, rather shorter than the round, smooth, parallel-fined. Umbels of two or three flowers. Anthers unequal."—Gathered by Mr. Brown, near Port Jackson, New South Wales.

Th. junceus. Rush-leaved Fringe-blossom. Br. n. 9. (Chlamydomphora junceolafum ; Salif. Parad. t. 103.) — "Root fibrous. Stems branched, diffuse, round, fringed; branches slightly anguilar. Radical leaves short; those of the stem straight, slightly spreading. Umbels of few flowers. Anthers unequal."—Native likewise of Port Jackson, from whence we have received specimens by favour of Dr. White. The "flora are about a foot long, diffuse, according to Mr. Brown, smooth, slender, rusby, alternately branched. Flowers about an inch in diameter, their inner segments obulate, delicately fringed. They are said to be very transient.

Th. dichotomus. Forked Fringe-blossom. Br. n. 14. (Ornithogalum dichotomum; Labillard. Nov. Holl. v. 1. 83. t. 109.) — Root fibrous. Radical leaves frilled. Stem round, frilled, with numerous rather spreading branches; forked above. Flowers solitary. Anthers unequal. — Gathered in Lewin's land by M. Labillardiére, from whom we have a specimen. The "flora is 15 or 18 inches high, repeatedly divided from the bottom, so as to afford corystome at the top, roughish to the touch, slightly leafy. Radical leaves numerous, about four inches long, erect, linear, obtuse, entire, channelled, rough with short, rigid, pale, prominent hairs; sheathing at the base; those of the stem solitary under each branch, short, axiled, frilled, clasping the stem with a dilated, membranous margin in the lower part. Flowers terminal, two or three to each branch, but it appears to us that the individual ones are solitary. Three inner segments purple on the inside, with a fringe of the same colour; their outside, like the whole of the outer ones, green. Anthers but lightly, if at all, unequal. Valves of the calyx beaked.

Sec. 2. Stamen three.

Th. triantrtr. Triandrous Fringe-blossom. Br. n. 18. (Ornithogalum triandrum; Labillard. Nov. Holl. v. 1. 84. t. 110.) — Root fibrous. Leaves linear, fringed, the length of the smooth unbranched common flower-flalk. Umbel many-flowered. Lower joint of each partial stalk several times longer than the bracteas. — Gathered by Labillardiére, in Lewin's land. Stalks one or more, compressed, a span high, as well as the numerous, all radical, leaves. Umbel of about nine flowers; its stalks joined below the middle. Stamin but three, opposite to the three fringed segments of the corolla, which are purple on the inside.


Gen. Ch. Cal. Perianth inferior, of five coloured, permanent, lanceolate, concave, hairy, spreading leaves. Cor. bell-shaped, of five spreading oblong petals, the size of the calyx. Stam. Filaments ten, short, reflexed; anthers roundish, crested, of two cells. Pjfl. Germen superior, quadrangular; styles four, thread-shaped, inserted laterally into the four angles of the germ; stigmas slightly elongated. Par. Drupas four, oblong, gibbous, recurved at the point, with a woolly coat, curling laterally. Stems. Nuts solitary, oblong-ovate, smooth, naked at the top, enveloped in their lower part with a hairy, fringed, red tunic.


1. Th. Palala. Deeli Khé of the Cochinchine. —

Native of the woods of Cochinchina. A large, woody, nearly erect, branching furub, without thorns. Leaves pinnate, of about ten pairs of oblong, entire, smooth leaflets. Stalks axillary, many-flowered. Celaxes red. Corella white. Wing, or tunic, of the nuts red.

Such is the description of Loureiro, who quotes, with a mark of doubt, Palala ferruca; Rumph. Amboin. v. 2. 26. t. 6. But that is Myriffica, and has simple leaves. Yet hence the specific name appears to be taken. He more justly indicates the affinity of his plant to Sinuoba; Abl. Guan. 400. t. 153, of which we propose to treat hereafter in its proper place, under Schreber's name of Zwingerä.

We presume Loureiro's Thyfanus to be very nearly related to Cnestis of Jullien and Willdenow; see that article. The number of genera may be very variable or uncertain. What the author terms a drupa, appears, from its burking laterally, to be a true follicle, as is the feed-veil of Gewnfl. Whether the seed of the latter has any thing analogous to the fringed tunic, does not appear.

THYSDRUS, in Ancient Geography, a town of Africa Propria, and one of those which, according to Ptolemy, lay to the S. of Adrumetum.

THYSIUS, (THYS), ANTONY, in Biography, a philologyst, was born at Leyden in 1603, and became professor of eloquence and poetry in the university of his native city, and public librarian. Besides two or three works of his own, he was the editor of several editions of classics called "Variorum," of which were "Valerius Paternus," "Sallust," "Valerius Maximus," "Seneca the Tragedian," "Lactantius," and "Aulus Gellius." He died in 1670.

THYSSETAE, in Ancient Geography, a people who inhabited the territory near the Sarmate, where was the source of the river Tanaes. Ammianus Marcellinus says that these people had their abode in large forests, and lived by the chase. Their wives and children they had, he says, in common. Herodotus says they were a numerous nation, and governed by their own laws. Hardouin, in his notes on Pliny, says that they inhabited the banks of the Tanaes, towards that bend of the river, where it most nearly approaches the Wolga, and which is now the territory of Astrauchan.

THYSSELINUM, in Botany, a name adopted by Lobel in his Icones, 711, for the Selinum sylvestre of Linnaeus. Lobel cites Pliny, but the name in that author is Thyselium. The plant to which it belonged was "not unlike parsley, Apium; its roots when chewed purged humours from the head." Rivinus, Pentap. 1. t. 19 and 20, has the Linnaean Selinum sylvestre and palustre under the generic name of Thysselium, as has Tournefort likewise, in his Institutiones, 319. The latter differing from his genus from Orofelinum solely by its milky juice. As this juice is highly acid, these authors should seem to consider the word as derived from to, to burn, and sylven, parsley. Linnaeus omitted the first syllable as, in his opinion, superfluous.
TI A

TI A

flums, and even Haller follows his example. See Sr-

LAMIN.

THYSSUS, in Ancient Geography, a town of Macedonia, on about Mount Athos. Pliny and Thucydides.

THYSTUM, or THYSTUM, a town of Eotia. Suidas.

TIABA, a town of Asea Minor, in Caria. Strabo.

TIAVAR, a town in the interior of Arabia Felix, between Leptis and Appa. Ptolemy.

TIAVAR, in Geography, a town of Hindoostan, in the Carnatic; 6 miles W.S.W. of Pondicherry. N. lat. 11° 42'. E. long. 79° 12'.

TIGNANUCO, a town, in Peru, in the diocese of La Paz. This is a town of great antiquity, and is said to have received its name from one of the Incas. In it are some ruins, and a colossal pyramid, with a variety of human figures cut out of stone, which, though decayed by time, appear to have belonged to some gigantic nation; 36 miles N.W. of La Paz.

TIGURUS, in Ancient Geography, a town of India, on this side of the Ganges, and E. of the river Nomonias. Ptolemy.

TIGN-POTAO, in Geography, an island of Corea, about thirty miles in circumference, in the Hong-hai. N. lat. 3° 25'. E. long. 124° 52'.

TIANO. See Theano.

TIANO, a small island in the North sea, near the coast of Lapland. N. lat. 6° 42'.

TIANGNIES, a town of France, in the department of Jemappes; 6 miles S.W. of Tournay.

TIANTONG, a town of Upper Slam, on the Mecon; 20 miles N.W. of Perpignan.

TIAYOU-SU, a small island in the Chinefe sea, belonging to the tribe called Lienou-kieou. N. lat. 25° 55'. E. long. 128° 35'.

TIA, 1749, an ornament, or habit, with which the ancient Persians covered their heads; and which the Armenians and kings of Pontus wear on medals: thefe last, however, have been deftined from the Persians.

Latin authors call it in-differently tiara and bidari.

Strabo says, the tiara was in form of a tower, and the feholium on Ariflophanes's comedy, Aspasia, act i. scene 2, affirms that it was adorned with peacock's feathers. Some moderns, however, fancy the feholium is here speaking of the caque which the ancient Persians wore in war, rather than of the habit which they wore on the head in the city.

The kings of Peria alone had the right of wearing the tiara ftraight and erect; the prifles and great lords wore it defpered, or turned down on the fore-fide. Xenophon, in his Cyropedia, fays that the tiara was sometimes encompassed with the diadem, at head in ceremonies; and had frequently the figure of a half-moon embroidered on it: others are of opinion, that the diadem was in form of a moon, and that it was hence the tiara was called luna. Lally, others think that the tiara itself was made fometimes in form of a half-moon. From what we have said, it appears that there were different forms of tiaras; and, in effect, Pachau- lius, De Coreollis, distinguishes no less than five different kinds. See Diadem.

The tiara was also an ornament belonging to the Jewish priefles. Exodus xxviii. 40. xxxix. 26.

TIAR is also the name of the pope's triple crown; ancienfly called regnum.

The tiara and keys are the badges of the papal dignity; the tiara of his civil rank, and the keys of his jurisdiction: for as soon as the pope is dead, his arms are represented with the tiara alone, without the keys.

The ancient tiara of the popes was a round high cap.
Am. Acad. v. 2. 351. — Leaves ternate, lobed and toothed. Stem leafy. Clutter compound. — Gathered by Mr. Menzies on the north-west coast of America, where it is frequent in woods. Linnaeus saw it only in the collection of plants from Kamtschatka, submitted to his inspection by Demidoff, and described in the 2d volume of the *Annates Academiae*; for there is no specimen in his own herbarium. The root is tuberous, and somewhat creeping, perennial. *Stm. above a foot high, erect, simple, leafy, smooth and slender. Leaves all ternate, slightly hairy, paler beneath; the leaflets somewhat rhomboid, acute, more or less deeply lobed, and irregularly notched, an inch or an inch and half in length; the lateral ones often deeply divided; so that they much resemble some of the more delicate species of *Rubus*. The radical leaves have long slender *footstalks*; those on the stem short ones. Clutter many-flowered, from three to six inches long, alternately branched; the branches corymbose, each bearing from three to five or six very small greenish-white flowers. The ball of the *calyx* is concave, or slightly bell-shaped. *Calyx* half an inch long, each valve tipped with a permanent, elongated, capillary *style*.

4. *T. biterna*. Compound-leaved Tarilella. Venetia. Malmaison t. 54. Pursh n. 4. — Leaves twice ternate, lobed and toothed. Stem leafy. Panicle compound, divaricated; its branches somewhat spicaded. — Found on the mountains of South Carolina, flowering in May. *Stem* perennial. *Stem* a yard high. The appearance of the plant is jutly comprised by Ventenat to *Spinea Aruncus*. The leaves consist of nine large ovate *leaflets*, slightly hairy, partly lobed, and all strongly toothed, or notched. *Flowers* very small, yellowish-white, almost fleshy, disjuxtaposed in numerous long *clusters*, forming a large, spreading, repeatedly branched *panicle*. The petals in Ventenat's figure are narrow, elliptical-lanceolate. Pursh says they are sometimes wanting. The appearance of the *calyx* in that figure is very different from the other species, and the valves are of equal length. This plant is said to have proved biennial in the garden of Malmaison; but it may still be perennial in its native country. We have seen no specimen, nor has this curious species, any more than the last, yet found its way into the English gardens.

**TIARINI, ALESSANDRO.** In *Biography*, an historical painter, who was born at Bologna in 1577. He was a disciple of Prospero Fontana, and on the death of that master, he received instructions from Bartolomio Celi, from whom, being obliged to leave Bologna on account of a quarrel, he went to study under Passignano at Florence. After some time, about seven years, as the influence of the circumstance which had driven him from his native city subsided, he ventured to return there, and became a pupil of the Caracci; and he principally attached himself to Ludovico, more for the improvement of his style, than for practice. He had, during his residence at Florence, acquired considerable fame, and painted several pictures for churches and convents in places within and round about that city. On his return to Bologna, his talents acquired him considerable employment there, and many of his principal works still adorn its public edifices. Ferdinand, duke of Mantua, invited him to take up his residence with him; but to him for his portrait, is did all the princes of his family, and many of the nobles of his court.

The colouring adopted by Tiarini in his best time is clear and rich; his design tasteful and agreeable, though of a serious cast; and his expression just and natural; and there are not many artists who have done more credit to the Bolognese school. He died in 1668, at the advanced age of 91.

**TIARIULIA, in Ancient Geography.** a town of Ilif-pania Citerior, in the interior of the country of the Herculis. Ptol.

**TIARP, in Geography.** a town of Sweden, in Welfmankland; 25 miles N. of Upfal.

**TIASSE, in Ancient Geography.** a river of the Peloponnese, in Lacoonia, which ran between Sparta and Amycla. Paus.

**TIASUM, a town of Dacia, in the vicinity of Nantida and Zugna.** Ptol.

**TIASP, a town of India, on this side of the Ganges, W. of this river and near it.** Ptol.

**TIAS, in Geography.** a town of Perfi, in Chufsitan; 135 miles N.W. of Shuter.

**TIBAENS, a town of Portugal, in the province of Entre Duero et Miluo; 4 miles W. of Braga.**

**TIBALDI, PELLEGRINO, in Biography, was born at Bologna in 1527. He was the pupil of Bagnacavallo, and copied with much attention the works of Valari, in the refactory of S. Michele in Bofco. At the age of twenty he went to Rome, chiefly to study the works of Michael Angelo. The pictures he produced at Rome obtained for him the patronage of the cardinal Paggi, who employed him in ornamenting his Vigna, near the Porto del Popolo, with works in fresco, and then sent him back to Bologna, to assist in the completion of his palace there (now the Academic Institute), both as architect and painter; and in both characters it remains as the principal testimonial of his powers remaining in Italy. He also constructed and adorned a chapel for his patron in the church of S. Ciocapo Maggiore. One of the paintings he executed there was the *Presentation of St. John*, and another, the *Last Judgment*; where, in the opinion of the Caracci, he almost equalled the majesty of Michael Angelo, and it was preferred by them to all the other works of Pellegrino, and served them and their scholars as a model of study.

From Bologna, the cardinal sent him to Loretto, to superintend the erection of a chapel in the church of La Madonna, which he also ornamented with frescoes and paintings of the Nativity, the Presentation in the Temple, the Transfiguration, and the Decollation of St. John. From thence he went to Ancona, where he was made a deputy of S. Agostino and Criaco; and in the great hall of the merchants he painted one of his most celebrated pictures, the subject of which is Hercules overthrowing monsters. He also superintended, as military architect, the fortifications of the place, about the year 1560; and two years afterwards visited Pavia, where he constructed the palace of the Saporza; he then went to Milan, and there built the temple of S. Fidele, and before the year 1570 was elected architect of the cathedral.

Here he ditionembered the dome of numerous Gothic monuments, sepulchral urns and trophies, and embellished it in their stead with various chapels and a majestic choir. He soon after received a commission from Philip II. to prepare designs and plans for adorning the Escorial, both architectural and pictorial. He followed them to Spain himself in 1586. There he superintended the work for nine years, painting a great number of pictures, particularly some in fresco in the lower cloister, whence he expunged the unsuccessful productions of F. Zuccherio. The subjects were from scripture, of the Purification; the Flight into Egypt; the Murder of the Innocents; Christ tempted in the Wilderness; The Election of the Apostles; The Resurrection of Lazarus; The Expulsion of the Money Changers from the Temple; and the Resurrection of our Saviour. Besides these, he painted during his residence in Spain several pictures
B

Black every thought is and appears and is St. Hebrew this contains they is r the all fondamento."

Hebrew this contains they is r the all fondamento."

The compositions of the chapel Poggi, in St. Giacomo, where the imitation of Michael Angelo is blended with that of Raphael, Coregio, and D. da Volterra, contain the rudiments of their own stylen.

Pellegrino Tibaldi is more known by his works in fresco than by his pictures in oil, which are extremely scarce: one of the earliest is the Nativity, already mentioned, in the Palace Borghese, of which the cartoon still exists in a private collection of drawings. It is painted in a sober unaffected tone, and considered as the work of an artist jealous of his line, with great mellowness of touch. The figures of this are considerably less than the size of life; but there are pictures of his to be met with of diminutive dimensions, with all the finish of miniatures, though rich in figures, touched with great spirit and equal vivacity of colour; they are generally set off by backgrounds drawn from his favourite branch of art, architecture. Fujioli's Pilkington.

TIBARANIA, or TIBERARIA, in Ancient Geography, a country of Asia, in Pontus, in the vicinity of Cappadocia, and adjoining the country of the Chalybes. Steph. Byz.

TIBERIA, a town of Thrace, founded by the emperor Tiberius, whence its name.

TIBERIACUM, a town of Italy, near Ravenna.—Aifo, a town of Lower Germany, upon the route from Colonia Trajana to Colonia Agrrippina, between this latter place and Juliacum, according to the itinerary of Antonine.

TIBERIADIS Water, the water of a hot spring near Tiberiades in Egypt.

Dr. Perry, when on the spot, tried some experiments on this water, which give us a much better idea of its nature than we have from any other accounts of it. Half a dram of oil of tartar being mixed with an ounce and half of the water, it becomes turbid and muddy; and after twelve hours, three parts of the whole appear like white wool, only leaving a small portion of clear water at the top. The white woolly matter dried, produced only a small quantity of yellow ochre.

Spirit of vitriol added to the water in the same quantity, affords a large unifrous sediment of a white colour. A solution of sublimate being mixed in the same quantity, it became turbid and yellowish, and yielded an earthy sediment in small quantity; whence it seems evident, that it contains a salt murale. Saccharum faturini being added in the same quantity, the water deposited a lateritious sediment in a small quantity. Mixt with spirit of fal ammoniac, it turns to a blueish-green turbid liquor, and finally yields a woolly sediment. Sugar of violets mixed with it, turned it to a yellow colour; and the scrapings of gall mixed with it, turned it to a deep purple; and on shaking, this became as black as ink.

It appears from these experiments, that the water contains a good deal of a grofs fixed vitriolic salt, some alum, and a salt murale. It is too salt and nauseous for internal use; but it must be of use as a bath in all cutaneous froulness, especially in scorbutic and leprous cases; for it will powerfully deterge, scour, and cleanse the excrettory pores, and it may be, by its weight and stimuli, restore them to their natural state and tone, and restore the true state of the vitiated solids in general. Phil. Trans. N° 462, p. 52.

TIBERIANI CAMPi, in Ancient Geography, fields of Italy, in the vicinity of Rome, which took their name from the emperor Tiberius, who fixed them at 25 acres.

TIBERIAS, a town of Pale-fine, the capital of Galilee, was situated in a plain, near the lake of Genesareth, which from this city was also called the lake or sea of Tiberias. This city is very famous, and often mentioned by Jewish writers, because, after the taking of Jerusalem, there was at Tiberias a succession of Hebrew judges and doctors till the fourth century. It was a bishop's see in this century. Epiphanius says that a Hebrew translation of St. John, and the Acts of the Apostles, was kept in this city. It was distant about 90 miles from Jerusalem. See TABARIA.

TIBERINA INSULA, the ile of Tiber, situated in the city of Rome; called by Suetonius the ile of &esclapius. Plutarch says that this island was called at Rome the sacred ile and the ile of two bridges, because in consecrating to Mars a field which belonged to the Tarquins, they threw into the
the river the corn and also the trees which grew in this field. These materials, united with the mud brought down by the river, formed an island, on which were built several temples and porticoes.

Tiberina Regia, a country of Asia, in Cappadocia, where was a place named Ariarzus.

TIBERIOPOLIS, a town of Asia, in Phrygia Major. Ptol.—Ala, a town of Bulgaria, upon the coast of the Euxine sea.

TIBERIS, or Tiber, a river of Italy, which had its source in the Apennines, towards a place called Tifernum Tiberinum. Its course was first towards the S. passing by Perusa, as far as Tuder, where it turned towards the S.W. as far as the Volturno. Having received the Claneis, it turned towards the S.E., received the Nar at Hortamont, and continued in this direction as far as a point that lies between Capena and Cures. Assuming a direction towards the S., it falied to Rome, and then proceeded towards the S.W. to the sea before Olia, i.e. the mouths, of which it has many. This river was inconsiderable till it reached Hortamont; but afterwards it was augmented by the Nar, the Volturno, and the Anio, so that at Rome it was large and deep. The ancients, by way of enhancing its celebrity, represented it as receiving twenty other rivers; but under this general denomination they must comprehend several small streams. It was called by various names.

TIBERIUS CLAUDIUS NERO, in Biography, a Roman emperor, so called after his father, his mother's name being Livia Drusilla, was born in the year B.C. 42. He was at an early age so well instructed in Greek and Roman literature, as to be able, when nine years old, to pronounce a funeral oration for his father, which gained great applause. His temper was naturally refined and gloomy, and yet, with the advice of his mother Livia, who was married to Augustus, he conducted the usual spectacles with a magnificence which gave satisfaction to the Roman people. His first appearance in a military character was as a tribune in the Cantabrian war; he next fulfilled the office of commander-in-chief in placing Tigranes on the Armenian throne, and on his return was made praetor. He was afterwards sent to join his brother Drusus, and gained a decisive victory over the Rhetsians and Vindelicians. He became consul in the twenty-eighth year of his age, and thus rapidly advanced to the rank which, as the emperor's step-son, he was likely to obtain, and his elevation was accelerated by the death of Agrippa, B.C. 22. Previously to his being admitted into a partnership of the empire, Augustus obliged him to divorce his wife Vitania, the daughter of Agrippa, and the object of his choice and affection, and to marry his own daughter Julia, of doubtful reputation.

The next object of his military career was the reduction of the Pannonians, in consequence of which he was honoured with triumphal ornaments. From his successful prosecution of the war in this part of the empire he was suddenly called to attend his brother Drusus in his last moments; and he afterwards accompanied his remains on foot in a funeral procession to Italy. After his victories had been celebrated by an ovation, he was deputed to make peace in Germany, and being a second time made consul, B.C. 7, he triumphed on the day when he took possession of his dignity. At the expiration of the year, Augustus conferred upon him the tribunitian power for five years. At this time Caius, one of the emperor's adoptive sons, though under age, was raised to the pontificate, and introduced into the senate. Jealous of Caius as a rival, and disgusted by the open gallantries of his wife Julia, he resolved to ask permission to withdraw from public business, and to live in retirement at the island of Rhodes. Accordingly he failed for Rhodes. His wife's conduct became so notorious, that he was banished by her father to the isle of Pandataria, and divorced from her husband. Having obtained leave of the emperor, though reluctantly granted, to return from Rhodes to Rome, he lived privately till the death of the two Caesars, Caius and Lucius, opened to him new prospects. The emperor, whose declining age needed an associate, adopted Tiberius A.D. 4, renewing his tribunitian power, and then placing him next to himself in the empire. Having brought the war against the Pannonians and Dalmatians, as much by policy as by force, to an honourable termination, he obtained a triumph, A.D. 9; and as a recompense of other services, his tribunitian authority was prolonged: but the emperor terminating his life at Nola, Tiberius, without opposition, succeeded to the empire, in the fifty-fifth year of his age. Past experience had taught him the art of dissimulation, and this art he practiced during the progress of his reign. Although he was very jealous of his authority, he was moderate in the exercise of it, and always paid great deference to the senate, and respect to the consuls. He was zealous in the administration of justice, and avoided oppressive imposts even in the most distant provinces, for which he had the less occasion, as he was not avaricious of money; a virtue which, as Tacitus says, he retained, when he had renounced all others. To which we may add, that he was munificent in his relief of public calamity and private distress. These qualities, combined with his found fene, rendered the earlier part of his reign as prosperous as perhaps any in the annals of the empire.

The popularity of Germanicus rendered Tiberius jealous, and vigilant of his conduct; and in order to restrain his authority, he employed Piso, a man of ancient family and imperious spirit, as his subordinate agent for this purpose. Germanicus, however, died of a lingering disease, and Piso was suspected, if not accused, of having given him poison. Piso was impeached in the senate for his conduct towards Germanicus. In the course of his trial, Tiberius acted with apparent impartiality; but the accused, despairing of an acquittal, put an end to his own life. Tiberius, in the seventh year of his reign, withdrew from Rome to Campania, in order to accustom Drusus, who was then consular, to the exercise of the supreme power. Notwithstanding several influences, in which he manifested a moderate exercise of power, a stern unfeeling tyranny was becoming the settled character of his reign, to which his growing confidence in the detestable Sejanus very much contributed. The death of Drusus, A.D. 23, occasioned by poison, administered in consequence of the seduction of his wife, was borne by his father Tiberius with a degree of self-possession, which was imputed to want of natural affection. After this event he appeared in the senate; and the two elder sons of Germanicus were preferred to him. Taking them by the hand, and delivering a speech which melted the whole assembly into tears, he recommended these orphans, who had lost both their uncle and father, to the guardianship of the senate. Two years after the death of Drusus, Tiberius took an opportunity, which a proposal for erecting a temple to him and his mother afforded him, of giving his sentiments on that subject which disgraced the reigns of the Roman emperors. Recognizing himself as a mere mortal, subject to all the infirmities of the human condition, and sufficiently honoured in holding the first place among men, he was detestable that posterity should know his sentiments on the subject, and that he wished for no other honours paid to his memory than to be thought to have worthily performed the duties of his station. The whole speech, replete with wisdom and
TIB
dom and good sense, is reported by Tacitus. His design of retiring from the capital, encouraged by selfish purporses by Sejanus, was put into execution A.D. 37. Accordingly he withdrew into the Isle of Capree, near the bay of Naples. Here he passed his remaining years, immersed in grofs and infamous debauchery, having mankind, fearfully known to exit but by his cruelties, and rendering himself, in direct opposition to his own maxims, "let them hate, provided they esteem me," no less contemptible than odious. It ought to be mentioned, however, that in a conflagration which consumed a large quarter of Rome, he displayed a very laudable and spontaneous munificence. For an account of his connection with Sejanus, and of the effects and termination of that connection, we refer to the article Sejanus.

The latter part of Tiberius's reign was marked by servility on one hand, and despotic ferocity on the other; and it appears by one of his letters to the Senate, that he suffered as much misery from the anguish of self-reproach and tumult of mind as he inflicted: "What shall I write to you, conscript fathers, or what I shall not write, or why I should write at all at this time, may the gods and godfiees plague me more than I feel daily that they are doing, if I can tell!" What mental torture must have been, says Tacitus, that could have exorted such a confession. Some few occasional acts of wildom and munificence brightened in a faint degree the black picture that was exhibited by his general conduct. Towards the close of life, and at an advanced age, the appointment of a successor engaged his attention. He had two alternatives; the one was the nomination of Caius, his grandson, the son of Germanicus, who was his adopted son; and the other, the appointment of Gemellus, the son of Drusus, who was his son by nature. The former was of mature age, being now twenty-five, and possessed of popular favour. The diffumulation of this aspirant to the empire had not eluded the penetration of Tiberius. See Caligula.

Tiberius, leaving Capree, frequently changed his abode, and at last settled at a country-house, which had belonged to Lucellas, near the promontory of Misenum. There, on March 16th, A.D. 57, he sunk into a fit, in which he appeared dead; upon which Caius, with indecorous precipitation, proceeded with a numerous efort to seize possession of the empire; but his revival threw them all into confusion. At this instant Macro, the preternior priest, caused him to be suffocated with pillows. He died in the seventeenth year of his age, and twenty-third of his reign, universally execrated; and his predominant vices were such, that they have almost effaced the records of his laudable qualities.


Tiberius Constantine, emperor of the East, was a Thracian by birth, and by office captain of the guards to Jullian II. By the recommendation of the empress Sophia, he was raised to the rank of Cæsar A.D. 574, and in 578, when Jullian died, succeeded to the imperial throne. Sophia, attached to his person, had flattered herself with the hope of his being her second husband; but on his accesion to the empire, it appeared that he had been previously married to Analecta, who was proclaimed Augusta. Sophia, thus disappointed, concurred in a conspiracy for raising to the purple Jullianus, commander of the eastern army; but the plot being discovered, Sophia was punished by losing the greatest part of her allowance. The government of Tiberius has been favourably represented. He was temperate, juf, and humane; economical in the disbursement of the revenue, yet liberal and beneficent, and ready to remit the dues of taxadon to sufferers under public calamity. The principal events of his reign were two victories over the Persians. Soon after the second victory, Tiberius fell into a dispaee, during which he declared Maurice, who had married his daughter Contantine, and who had been nominated Cæsar, his successor; and after a reign of four years, he closed his life in 582, with the general regret of his subjects. Anc. Un. Hist. Gibbon's Rom. Emp.

TIBESTI, in Geography, a town of Africa, on the route from Fezzan to Bornou, inhabited by the people called Tibbe (which fee); 150 miles S.E. of Mourzouk. The vales of Tibesti are fertile in corn, and paturage for cattle, of which they have numerous herds; and they are particularly celebrated for their breed of camels, which are esteemed the best in Africa. For this fertility they are indebted to the water of the innumerable springs, which amply compensate for the want of rain, which seldom, if ever, falls within the limits of Tibesti. Among the natives of Tibesti, different religions are professed; for some of them are Mahometans, and others continue attached to their ancient sytlem of idolatry. From the plain, which lies to the W. of the desert of Tibesti, a part of the mountains of Tibesti take their rise. These vast hills, the range of which is very extensive, are variously peopled; but such of them as are crossed on the route from Fezzan to the city of Bornou, are inhabited by a mixture of Muffulmen and idolaters, who employ themselves in breeding camels and ases, and other cattle, particularly horses of a small size.

TIBET. See THIBET.

TIBI, a town of Arabia, in the country of Oman; 8 miles N. of Kalhat.

TIBIA, in Anatomy, the large bone of the leg. See Extremities.

Tibia, Fractures of the. See Fracture.

Tibia Biceps. See Biceps.

Tibia, in Musics, was originally a flute, made of the shank or shin-bone of an animal; and when the art of boring flutes was discovered, they were made of box-tree, laurel, brash, silver, and even of gold. See Flute.

Tibia Articularis. See Bagpipe.

Dr. Burney (Hist. Mus. vol. i. p. 521.) apprehends that the union of this instrument with the syrinx suggested the first idea of an organ.

Tibia Pares et Impares, in the Dramatic Music of the Ancients. It has been long doubted, whether pares and impares meant double and single flutes, or equal and unequal in point of length and fize. But though in preferring either of these acceptations, some sense and meaning is acquired, yet we should incline to the latter. For in none of the representations in ancient painting or sculpture, which we have yet seen, does it appear that the tibiae, either at sacrifices or in the theatre, plays on a single flute, though we as often see double flutes of different lengths in his hands, as of the fame length; and as harmony, or music in different parts, does not appear to have been practiced by the ancients, the flutes of equal length may naturally be supposed to imply unisons; and unequal, such as are octaves to each other.

TIBIALIA, among the Romans, a kind of swaths with which they used to cover their legs.

TIBIALIS, in Anatomy, a name applied to various organs situated in the neighbourhood of the tibia. There is an anterior and a posterior tibial artery; an anterior and posterior tibial nerve (see Artery and Nerve), and the two following muscles.

Tibialis Anticus, jambier antérieur, tibio-fustarten; an elongated muscle, flattened at the fides, placed on the front of the leg, and extending from the upper end of the tibia to the first cuneiform bone. It is covered in front by
the aponeurosis of the leg, to which it adheres closely at the upper part: the anterior surface of the muscle forms the convexity on the outside of the tibia, which is more considerable in strong muscular subjects. The inner flat surface corresponds to the outer or concave surface of the tibia, and is attached to its upper half; the outer surface corresponds above to the extensor longus digitorum pedis, below, to the extensor longus pollicis pedis: the anterior tibial velifies and nerve being interposed. The posterior edge of the muscle is attached to the upper three-fourths of the interosseous ligament, then it lies on the front of the tibia, on the ankle joints, and on the upper and inner part of the tarus. The upper extremity of the muscle is fixed to the front of the external tuberosity of the tibia; thence it descends parallel to the tibia, first increasing in size, then diminishing again, and ending about the lower third of the leg in a thick and flat tendon, which descends over the front of the tibia, and of the ankle, confined by the superior annular ligament of the tarsus. (See Fascia.) Having passed this ligament, the tendon paffes forwards on the foot, then turns obliquely inwards, becoming a little broader, over the convexity of the first cuneiform bone, and divides into two portions. The posterior, which is the largest, is fixed to the inner and front part of the bases of that bone; the anterior and smaller is attached to the posterior extremity of the first metatarsal bone.

The lower part of the tibialis anticus consists of a strong tendon, which enters the substance of the muscle, and expands into an aponeurosis reaching nearly to the upper end of the muscle. The fibrous fibres arise from the falcum of the leg, from the external surface of the tibia, from the interosseous ligament, and from an aponeurotic feptom between it and the extensor longus digitorum. They pass obliquely to both surfaces of the tendon, like the bars on the shaft of a feather, and are continued much lower on its posterior than on the anterior surface.

It bends the foot on the leg, and turns the point inwards: it elevates at the same time the whole internal edge of the foot. It brings the leg forwards on the foot, and maintains it in that position.

TIBIALIS Posticus, jambeur postérieur, tibio-lous-tarden, is a long narrow muscle, thicker above than below, placed at the back of the leg, under the calf, and extending from the upper part of the tibia and fibula to the os navicular. It is covered behind by the soleus, by the flexor longus digitorum and pollicis pedis. In front it is attached to nearly the whole posterior surface of the interosseous ligament, and above, to the posterior surface of the tibia. On the outside it is fixed to the fibula. Its upper extremity is divided into two portions, an external and smaller attached to the fibula, an internal larger to the tibia and interosseous ligament; they are separated by an interval, through which the anterior tibial artery passes. The muscle descends parallel to the bones of the leg, and arcuated between them, becoming larger to its middle, from which it again diminishes; towards the lower part of the leg it forms a strong tendon, which runs in a groove hollowed in the external malleolus, and surrounded by a fibrous sheath, which separates it from the flexor longus digitorum. In this groove the tendon becomes broader: it passes below the head of the tibiagrus, swelling into a hard and nearly bony substance, and is attached to the lower and inner part of the os naviculare, and to the bases of the first cuneiform bone. The inferior tendon ascends into the muscle, expanding into an aponeurosis, in which the fibrous fibres are inserted obliquely on all sides from the fibula, the tibia, the interosseous ligament, and the aponeurosis, which covers it from the flexor longus digitorum. It extends the foot on the leg, turning the sole and point a little inwards. It will carry the leg backwards on the foot, when that is fixed.

TIBICEN, in Ancient Musici, a flut-player. TIBICEN, in Ichthyology, a fish of the trigla kind, called by many authors byrus, or the harp-fish; and in some parts of England, the piper.

The head of this fish runs out into two broad horns, which are ferrated, or bet with a fort of teeth, or small spines, all along their edges, which is its principal distinction from thehirundo or swallow-fish. Above the gill-fins it has on each side a long and sharp spine. The forehead is elevated into a sort of eye-brows over the eyes: and at the angles of these there are small and short spines, which are long and crooked. The side fins feel but very little rough to the touch, and the forehead between the eyes is not hollowed. The whole head is covered with a bony crust, which runs into two horns or spines behind. It has three fingers or filaments on each side, from the roots of the gill-fins; and its jaws are rough like files, but have no distinct teeth. The tail-fin, and the middle of the back, in this fish, are red. It is caught in the Mediterranean, and in some other seas. In our county of Cornwall it is not unfrequently caught about the shores, and from the noise it makes, when taken out of the water, is called the piper. Ray and Willughby.

TIBIGENSE OPPIUM, in Ancient Geography, a town of Africa Propria, according to Pliny; called Thigbya by Ptolemy.

TIBIGI, in Geography, one of the rivers of the Brazils, which flow into the Parana, rich in diamonds, as the few families that live in its vicinity have reason to remember with gratitude. West of this river and of Corrinita, it is dangerous to land, since in that direction are the Anthropophagi, who were driven from these boundaries at a very recent period. The country to the N. abounds with wood.

TIBILIS, in Ancient Geography, a place of Africa, distant 10 leagues S.W. from Hippo Regius, and 16 miles E. of Cirta: where are many ruins.

TIBISCA, a town of Lower Media. Ptol.

TIBISCU, one of the most considerable towns of Dacia. Ptol.

TIBISCU, a river of Dacia, which ran into the Danube.

TIBISIS, a large river, which rofe in mount Haemus, and pursuing a north course, discharged itself into the Ister.

TIBIUM, a mountain of Asia, in Phrygia.

TIBOELAELE, in Geography, a town on the S. coast of the island of Ceram. S. lat. 3° 19'. E. long. 128° 45'.

TIBOUCHINA, in Botany, an unexplained barbarous name, Aubl. Guian. 445. t. 177. Julf. 329. The shrub which bears it is suspected by Schreber to be a species of Melastoma. (See that article.) We fee no reason to question this, though Aublet describes the fruit as a dry capule; for the known Melastoma differ greatly in the degree of pulp in their berries, especially according to the period at which they are examined.

TIBOULEN, in Geography, a small island in the Mediterranean, near the coast of France. N. lat. 43° 15'. E. long. 6° 24'.

TIBOURBOU, in Botany, the Caribbean name of a fine tree of Guiana and Cayenne, called Apiaiba Tibo-bou in Aubl. Guian. 538. t. 213. See Aubletia and Sloanea.
TIBRACANA, in Ancient Geography, a town of Asia, in the interior of Media. Pol.

TIBULA, or Tibula, a town situated on the northern coast of the island of Sardinia. Pol. Iter. Anton.

TIBULLUS, Attics, in Biography, a Roman poet of the Augustan age, of the equestrian rank, whose native place and time of birth are not ascertained. His patrimony was much impaired, either by his own prodigality, or by the devastation of several wars; but yet he does not seem to have been distinguished by any tokens of the liberality of Augustus and Maecenas, the munificent patrons of literature at the period in which he lived; nor does he mention their names in any of his poems. M. Valerius Meffala Corvius, upon whom he composed a panegyric, was his particular friend and patron, whom he accompanied in his expeditions to Asia; but he preferred peace and retirement in the society of one of those objects of his affection whom he has celebrated in his elegies. Horace, with whom he was intimate, has addressed to him an ode and an epitaph, complimenting him as a candid judge of his writings, and describing him as possessed of every worldly advantage. It has been inferred, from an epigram of Domitian Marcus, that he died about the same time with Virgil, B.C. 19, in the flower of his age. Ovid lamented his death in a beautiful elegy, representing his mother and sister as mourners at his funeral, and speaking of him as a poet of the highest reputation.

The poems of Tibullus are elegies comprised in three books, and a panegyric of Meffala. His fame is founded on his elegies, which are described by one of his biographers as occupying, by the testimony of ancient and modern critics, the first class of such compositions with regard to the appropriate qualities of elegance, tenderness, and that beautiful simplicity, which is the character of real feeling. Their principal subjects are "love and rural life." With his description of a passion which is illicit, he has blended "more touches of a pure, and what may be termed a congenital affection, than almost any other Roman poet. His language is a true example of what the Latins call tenes, or neat and polished. He is easy and natural, with scarcely any mixture of learned allusion or figure." His works are usually printed with those of Catullus and Propertius; but of the separate editions, the most esteemed are those of Brookhufius, Amst. 1708, 4to.; of Vulcius, Patav. 1749, 4to.; and of Heyne, Lips. 1755, 1777, 8vo. Gen. Biog.

TIBUR, Tivoli, in Ancient Geography, a town of Italy, near the Anio, N.E. of Rome, in the country of the Sabines. Pliny refers its origin to the age which preceded the siege of Troy, and says that its founder was Tiburinus, one of the sons of Ampharius, affixed by his two brothers, Catellie and Corax. This Tiburinus was regarded after his death as a god; and was worshipped in a wood consecrated to him, and where a temple was erected to his honour. But Dionyfus Halicarnulensis pretends that it was built by the Siculi, before this epocha. For its situation, and some other circumstances attending it, we refer to the article Tivoli.

Horace has described in a few lines the beauties which he admired in contemplating this ancient city, Od. 7. 1. 4. "Nothing," says the poet, "draw me so much as the house of the refounding Albaneus, the lofty cedars of the Anio, the sacred wood of Tiburinus, and the gardens irrigated by unintermitting supplies of water." The "domus Albaneus resonantus" of the poet was the fofatara or sulphureous springs of the place, probably the crater of some ancient volcano, which perpetually discharged a kind of gas or mephitic vapour, that was thought to possess a fanatical quality, and to be a remedy for many disorders. Many persons resorted hither for relief; and Suetonius informs us, that Augustus also came for the benefit of the baths which the place afforded. These benefits were ascribed to imaginary deities, who were thought to preside over this privileged spot. Accordingly, a monument has been discovered, which indicated that Hygeia, the goddess of health, was worshipped here. The vapour possessed also a kind of inspiring quality, so that here was a temple of the Muses; and also, besides various other monuments, a temple in which was an oracle. Virgil informs us how this oracle was consulted. The "praecipes Anio" of Horace refers to the cascade of this river. The gardens and vineyards have to this day retained their celebrity; the wine of this canton being held in high estimation.

Tibur was also famous for its temple of Hercules, which had its college of priests and curators; a beautiful portico, where, according to Suetonius, Augustus administered justice when he resided here; and an excellent library of which Aulus Gallus speaks in his "Noches Atticas." Tibur had also a temple of the Sibyl, much admired for its elegance. This place was also famous for other monuments, now in ruins. Towards the end of the Roman republic, the adjoining territory was selected for superb buildings and houses of various kinds, all distinguished by their magnificence and beauty. Of these, the Tiburinus of Adrian was the most celebrated.

TIBURO, in Ichthology, a fish very badly and falsely described by several authors, and proving, on a strict inquiry, to be no other than the lamia or white shark.

The Tiburo of Linnaeus is a species of squalus, with a very broad and heart-shaped head, found in the American seas. Linnaeus queries, whether it is not a variety of the xynus, or hammer-headed shark.

TIBURON, in Geography, a town and bay on the S.W. coast of Hispaniola, near Cape Tiburum.—Also, a small island in the Pacific ocean, discovered by Megellan in 1520. It is variously laid down in maps. S. lat. 9°, 13°, 14°, 15°, 17°.

TIBURONES, or Main Cape Reef, two small islands, surrounded with rocks, near the coast of Honduras. N. lat. 15° 16′. W. long. 82° 8′.

TICADEE, a town of Hindostan, in the circuit of Ruttumpour; 15 miles N. of Dumah.

TICAL, in Commerce, a weight for gold and silver, and also a money of account in certain parts of the East Indies, particularly at Pegu and Siam. At Pegu, the weight of silver, under this denomination, is divided into 16 toises or touch. Gold and silver are here weighed by the tical, and their fineness is expressed by the parts called touch. The tical weighs 43 1/4 pagodas, or 237 7/8 English grains. The commercial weights are the vis of 100 ticals or tuals, and the candy of 100 vis. From the above weight of the tical, the candy should weigh 50 1/2 lbs.; nevertheless the English reckon it at 6 maunds 28 seers of the Bengal factory, or 500 lbs. avoid. dupo.

At Siam, the accounts are kept in catties, tales, ticals or tuals, maunds, fowanges, and cowries. The catty is = 20 tales, the tale = 4 ticals = 16 maunds = 32 fowanges; and the fowang is = 800 cowries. The coins are gold ticals, which pays for ten silver ticals; silver ticals, maunds, fowanges, and fumpeises, the latter being the fourth part of a fowang. The silver tical weighs 22 5/8 English grains, and being from 11 oz. 4 dwt. to 11 oz. 12 dwt. fine, is worth from 291 to 302 stiverling; but these coins are often adulterated; 1 tical pays commonly for 1 Spanish dollar, and 2 1/2 ticals for 1 Dutch
TIC

TICAO, in Geography, one of the Philippine islands, about 25 miles long, and from 3 to 8 broad. N. lat. 12° 39'. E. long. 123° 34'.

TICENA, in Ancient Geography, a town of Africa Propria, S. of Carthage, between the rivers Bagradas and Triton. Ptole.

TICENGIO, in Geography, a town of Italy, in the department of the Upper Po; 6 miles E. of Crema.

TICHASA, Te-GEWSE, in Ancient Geography, a town of Africa Propria, S. of Carthage, between the rivers Bagradas and Triton, 12 leagues S.W. of Capira; in which are some vestiges of the Romans. Ptole.

TICHENBRAY, in Geography. See Tinchebray.

TICHFIELD, a village of England, in the county of Hants, situated on a river which runs into the Southampton Water. Here Charles I. concealed himself, when he fled from Hampton-Court, in the year 1674, at a seat of the earl of Southampton. This seat had been an abbey, and is said to be the place where the marriage of Henry VI. with Margaret of Anjou was solemnized; 8 miles N.W. of Gosport.—Allo, a town of Jamaica, on the N. coast; 22 miles N.E. of Kingston. N. lat. 18° 12'. W. long. 75° 16'.

TICHIS, in Ancient Geography, a river which flowed from the Pyrenees, now Tich, in the department of the Eastern Pyrenees.

TICHITIUM, a town of Greece, in Eotia. Thucydides.

TICHOS, or TICHUS, a fortress of Achaia, in the eastern part to the S. of the promontory Arazum.

TICINDLO, or NAVIGIA GRANDE, in Geography, a canal made from the river Tefino to the city of Milan, by order of Francis I. king of France.

TICINUM, Pavia, in Ancient Geography, a town of Tranfpadane Gaul to the S.W. upon the river Ticinum, or near it. After the second Punic war, it attained the rank of municipal. Odoacer, king of the Heruli, destroyed it, and it was rebuilt under the name of Pavia, whence the name Pavia.

TICINUS, TESIN, a river of Tranfpadane Gaul, which commenced in the country of the Lepontini, traversed the lake Verbannus, and discharged itself into the Po, near Ticinum. It is celebrated for a battle of the same name, between the Romans, conducted by Cornelius Scipio, the father of Scipio Africanus, and the Carthaginians, conducted by Hamilcar, in the year of Rome 535, in which the Romans were defeated.

TICK, in Natural History, a nafty little animal of a livid colour, with a blunt and roundish tail, elevated antennae, a globo-ovate form, and full of blood; which infects cows, swine, goats, sheep, and dogs. The tick or ricinus is, in the Linnean sytem, a species of acarus in the opiliones order of infests.

In order to destroy and remove these noxious vermin, which spread very rapidly in sheep, it has been recommended to repare the wool, and to wash the diseased spots two or three times, or oftener, if necessary, with a liquid preparation, consisting of one ounce of cream of tartar, and a quarter of a pound of bay-falt, each finely powdered and sifted, and one ounce of corrosive sublimate, reduced into the same flate; the whole being well dissoled and mixed together in two quarts of soft water: or four pounds of soft soap, and two pounds of arsenic, may be steeped and dissolved in thirty gallons of water, and the animals be immersed in the infusion or solution, the heads of them being carefully kept above water, and the sheep being sheltered from rain for one or two days afterwards. The wool must be closely preffed, and the liquor that runs off be caught in a tub, or other vessel, for future use. The proportion above specified, is sufficient to bathe or wash forty lambs, or the same number of small sheep; and sometimes many more.

But the preparation which is in use at Holkham-Hall, in the county of Norfolk, for this purpose, consists of two pounds of tobacco, two pounds and a half of soft soap, and one pound of the white calx of mercury, well reduced into powder; the whole being boiled in eight gallons of water for an hour. This is a quantity sufficient for dressing fifty sheep, being applied by parting the wool down the shoulders and breast, and twice on each of the sides of the sheep, then pouring it very carefully so as to prevent its being wasted. It is said to be very effectual not only in destroying the vermin, but in removing the scabby fores that are produced.

It is stated in a paper in the third volume of the "Transactions of the Highland Society of Scotland," that the tick, or acarus redivivus, is a distinct or species or vermin of this kind from that of the kid, or hippobosca ovina, the former of which harraffes the lambs and trembling sheep in the spring season, while the latter molefts all forts and ages, but particularly hogs or young sheep, and chiefly such as are in a lean state. The former always adheres close to the bare spots of the shoulders, thighs, or ears, draining and drawing away the blood from them; and for the most part drops off about midsummer: but the latter harrours in the wool, bites the sheep, and sucks their blood. Smearing with tar, it is said, expels it from the skin, and it soon afterwards drops from the wool. Tobacco-juice is fatal to it almost instantaneously, and mercurial ointment destroys it. The former, or tick, is removed by the same remedies as the kid, and it is wholly prevented by having the young sheep in good condition. This distinction, in some cases, may be of considerable use to the sheep-farmer in the destruction and removal of such hurtful vermin.

Tick, in the Mange, a habit that some hores take of preffing their teeth against the manger, or all along the halter or collar, as if they would bite it.

Tick-Bean, or Ticks, in Agriculture, a term commonly applied to the small bean employed in the feeding of hores and other animals; of which there are several kinds, as the common ticks, the large flat ticks, the small or Effex ticks, and the French ticks. The first is a fort which is small and very commonly cultivated, but most generally by the farmers of Kent, where they are used for the fattening of hogs, and as food for hores, especially those of the team kind. The second is a larger fort than the common, and ripens somewhat earlier. They are very productive in some cafes; but from being larger in size, they are coarse and heavy, and consequently of rather less value the quarter or any other measure. They are sometimes called May beans. The Effex ticks are much smaller than the common, and of a rounder shape or form. They ripen a few days later, and are not so productive, but more valuable, as being heavier in proportion. The last fort, or small French ticks, are a still less kind, being only about as large as a middling-sized pea, and nearly circular. They ripen later than
than any of the other forts, but are the most valuable when dry, on account of their great weight.

Ticks are an important article of cultivation in most places, where the land is suited to their growth; and though they have been for a long time, and are at present, almost wholly confined to the counties of Essex and Kent, they may be raised in many other districts with equal success and advantage.

TICKERY, in Geography, a town of Hindoostan, in Bish; 15 miles N.W. of Gaya. N. lat. 24° 58'. E. long. 87°.

TICKELL, Thomas, in Biography, an English poet, was the son of a clergyman in Cumberland, and born at Bredkirk, near Carlisle, in the year 1686. He was admitted at Queen's college, Oxford, in 1701; and in 1707 he published a poem, entitled "Oxford," and inscribed it to Lord Lonsdale, expressing his gratitude to that university. In 1708 he took his degree of M.A., and two years after was elected a fellow of his college, under a dispensation from the crown against the statute which required him to be in orders. With a view of advancement by the exercise of his literary talents, he came to the metropolis, and ingratiated himself with Addison by an elegant copy of verses in praise of his opera of Rosamond. He contributed to the periodical publications of the "Spectator" and "Guardian," in the latter of which, all the papers on pastoral poetry, except one by Pope, are ascribed to him. During the negotiations which terminated in the peace of Utrecht, he published a very popular poem, entitled "The Prospect of Peace," which was highly commended by Addison, in return for which commendation he wrote his lines on the "Cato" of that author. On the accession of the Hanover family, to which he was attached, he prefented George I. on his arrival with a piece called "The Royal Progress," and he served the cause still more effectually by two satirical poems on the Jacobite party, viz. "An Imitation of the Prophecy of Nereus," and "An Epistle from a Lady in England to a Gentleman at Avignon." Tickell accompanied Addison to Ireland, and was there initiated in public buffoons with a view to future preferment. On occasion of Pope's publication of the first volume of his translation of Homer's Iliad, Tickell published a translation of the first book of that poem, which was patronised by Addison, so as to occasion an interruption of his friendship with Pope. When Addison was made secretary of state, Tickell was under-secretary, and continued in office under his successor Crayges. On the death of Addison, Tickell was entrusted with the charge of publishing his works, to which he prefixed a valuable life of the author. In 1725 he was appointed to the lucrative post of secretary to the lords-judges of Ireland, and retained it till his death, which happened at Bath in 1740. Tickell had been married and left a family.

Tickell is ranked by his biographers among English poets of the second order; equalled by few of his contemporaries in eloquence of diction and harmony of verification, and without lofty flights maintaining a decent elevation by a cultured style, and by just and ingenious thoughts. His funeral poem on Addison is pronounced by Dr. Johnson to be more sublime and elegant than any that is to be found in the whole compass of English literature. His "Ode to the Earl of Sunderland," and his "Colin and Lucy," are highly commended.

Richard Tickell, esq., a grandson of this poet, who was a commissioner of the stamp-office, has been known to the literary world by his "Wreath of Fashion," and especially by an effusion of political art and satire, entitled "Anticipations of the Debates of the House of Commons," 1778.


TICKELY, in Geography, a town of Hindoostan, in the circuit of Cicacole; 30 miles N.E. of Cicacole. N. lat. 18° 36'. E. long. 84° 34'.

TICKERA, a pattle which is prepared in Fezzan from dates and the meal of Indian corn, and which, whenever they travel, is in great request among the people of Fezzan.

TICKEREE, in Geography, a town of Hindoostan, in Oude; 48 miles N.E. of Manicopour.

TICKHILL, a market-town in the lower division of the wapentake of Strafford-and-Tickhill, in the West Riding of the county of York, England; is 4 miles W. from Bawtry, 7 miles S. from Doncaster, and 154 miles N. by W. from London. The houses are placed in a valley, and cover a large space of ground. Some of them are of brick, and others of stone; a few of them are respectable, but the more numerous have only a mean appearance. A market is held on Fridays, but is nearly fallen into disuse. A fair is kept annually for horses, horned cattle, and sheep. The population return of the year 1811, states that Tickhill contained 1508 inhabitants, who occupied 279 houses. The objects most worthy of attention are the church, and the remains of an ancient castle. The former is a spacious edifice, with a lofty and beautiful tower, and from its architecture seems to have been built in the reign of Henry III. The castle, of which nothing now remains but the lofty mound on which the keep formerly stood, with a ditch and part of the walls surrounding the fortresses, is situated on the south side of the town. An ancient gateway, forming the entrance on the western side, is the most curious part of the ruins. Part of these, with modern repairs and additions, is the seat of the honourable Frederick Lumley. A great part of the ground within the walls is converted into gardens and shrubberies. The steep declivity of the mound is formed into winding walks, leading by a gentle ascent to the summit.

The history of Tickhill prior to the Norman conquest is wholly unknown. It appears to have been one of the forty-nine manors given by the Conqueror to Roger de Bulf, who probably erected and resided in the castle. It was afterwards successively held by several noblemen, till Richard II. gave it to his uncle, John of Gaunt, duke of Lancaster, from whom it passed to the crown by the succession of Henry IV. In the year 1644 the castle was regarded as a very strong fortress, and was garrisoned for Charles I.; but being surrendered to the parliament, an order was issued that it should be dismantled and rendered untenable. The circular keep was in consequence demolished, but the foundations may still be traced by opening the ground. A royal free chapel or collegiate church was founded in the castle by queen Eleanor, wife of Henry II. It was given by king John to the prebends of the cathedral church of Rouen in Normandy. It was afterwards granted to the prior and convent of Lenton, Nottinghamshire; and in 1504 to the abbot and convent of St. Peter, Wellingtong. After the disolution it was given by Edward VI. to Francis, earl of Shrewsbury.

About two miles and a half from Tickhill is Sandbecks, the seat of the earl of Scarborough. The mansion, built by the late earl, is a large and commodious edifice, seated in a spacious park, which abounds with forest trees; and is adorned with an extensive lake. Near the western verge of the park, are the venerable and picturesque ruins of Roche abbey, which was founded in the year 1147, for monks of the Cistercian order. Here is a famous quarry, from which the
the stone for building the abbey, and for many other public edifices, was obtained.

About five miles nearly S. from Tickhill is Walding. Well, the seat of Sir Thomas White, bart. The house is a modern edifice, situated in a well-wooded park of considerable extent, and stands partly in Yorkshire and partly in Nottinghamshire; a small rivulet, which runs under a part of the out-buildings, forming the boundary between the two counties. In the park was formerly a priory of nuns, called St. Mary in the Park, founded by Ralph de Chevrolcourt. This religious house appears to have stood within the limits of Nottinghamshire. — Beauties of England and Wales, vol. xvi. Yorkshire; by J. Bigland.

TICKING, or TICING, in Hydrography, denotes the act of letting up turf in such a manner as they may be dried by the sun, and fit for being burnt into ashes on the land.

TICKLE HARBOUR, in Geography, a harbour on the E. coast of Newfoundland.

TICKLE me Quickly, a bay on the coast of Darien, near the Sambalas.

TICKISH, in the Mange. A horse is said to be ticklish that is too tender upon the spur, and too sensitive, that does not freely fly the spurs, but in some measure resists them, throwing himself up when they come near and prick his skin. A ticklish horse has somewhat of the ruminating, i.e. the kickers against the spurs; but with this difference, that the latter put back, leap, and kick, and yerk out behind, in disobeying the spurs; whereas a ticklish horse only resists for some time, and afterwards goes, and goes much better, through the fear of a vigorous hand, when he finds the horsemaster stretch his leg, than he does upon being actually pricked.

TICKSAH, in Geography, a river of America, in the Mississipi territory, which rises 10 miles N.E. of the forks of the Amite, and when it enters West Florida, is a creek of trivial size; it then becomes gradually augmented by several creeks, and after a S. course of 60 miles, falls into lake Maurepas, 4 miles N.E. of the mouth of Amite. Three miles above its mouth the Tickfah receives from the E. the united streams of the Natalbany and Pontchartrain, upon the latter of which stands Springfield, on the road from Madisonville to Natchez. Springfield is one of the landing places of travellers, who pass in schooners from New Orleans to Natchez. The above-mentioned Amite rises within the Mississipi territory, about 20 miles N. of the town of Liberty, in Amite county. The two streams that constitute the Amite, remain separate in their course through the Mississipi territory, but unite immediately upon entering West Florida, and then it joins the Iberville, and falls after a whole course of 100 miles into the lake Maurepas. Below the juncture of Amite and Iberville, the united streams form a navigable river, admitting vessels of six feet draught.

TICKSEED Sun-flower. See Coreopsis, and Sun-flower.

TICOLEA, in Geography, a town of Hindoostan, in Bahar; 7 miles N. of Bettiah. N. lat. 26° 55'. E. long. 84° 38'.

TICOLLOOSA, a town of the United States of America, in Tennessee; 38 miles S. of Knoxville.

TICONDEROGA, a township of Essex county, in the State of New York, erected in 1824. It is bounded N. by Crown Point, E. on lake Champlain, S. by Washington county, W. by Schroon, and includes the N. end of Lake George. Mount Defiance is in the S. part of this township. In 1830 it had about two hundred families, and thirty-five senatorial electors: seven saw-mills, three gramine-
mills, three forges, three carding-engines, and some other machines, and three school-houses. Here is also a steam machine, in which, by means of machinery moved with water, one man makes a hundred brooms a day. The inhabitants are mostly farmers.

In this township stands the fortresses of Ticonderoga, now a heap of ruins. It was built by the French in 1756, on a point of land formed by the junction of lake George, with lake Champlain, in N. lat. 43° 50', and 4° 14' E. long. from New York. It was, both by nature and art, a place of great strength. On three sites it is surrounded by water, and about half the other side is occupied by a deep swamp, and the line of defence was completed by the French with the erection of a break-work nine feet high, on the only accessible ground. In 1758, general Abercrombie with the British army unsuccessfully assaulted this fortress, and with the loss, as it is said, of 1944 men; but in July of the following year it was surrendered to general Amherst. It was the first fortress carried by the arms of America, in their contest for independence; being taken by surprise by general Allen, May 19, 1775, and retained till July 1777, when it was evacuated at the approach of general Burgoyne with the British army. This fort is never likely to be rebuilt; for the situation is very insecure, being commanded by the lofty hill called Mount Defiance. Mount Independence lies on the E. side of the lake, about two miles S.E. of the fort, between which two places there is a well-regulated ferry. The population of the township, in 1810, consisted of 985 persons.

TICOLO, a town on the W. coast of Sumatra, near the Line. E. long. 99° 21'.

TICOLO Island, a cluster of small islands near the W. coast of Sumatra. S. lat. 0° 2'. E. long. 99° 13'.

TICORANTE, a town of the island of Teneriffe.

TICOREA, in Botany, a name of Aublet's. — See Osphryllum.

TICOS, in Geography, a small island in the Pacific ocean, near the E. coast of the island of Luzon. N. lat. 14° 10'. E. long. 124'.

TICOUL HOUTIN, a town of Corea; 450 miles E.N.E. of Peking.

TICOUR, a town of France, in the department of the Mofelle; 6 miles N.W. of Morhange.

TICSAN, a town of Peru, in the jurisdiction of Cuenca.

TICUARIN, the name of the island of Goa, before the city was built.

TICUNAS, Poison, is an active poison prepared by the native Indians, on the borders of the river of the Amazons, in three or four degrees of south latitude, which, together with that of Lamas, Pesas, and Yameos, is extracted by fire from plants, called by the French lianes, and used in poisoning their arrows. See an account of the nature and effects of these poisons by M. Herrillant, in Phil. Trans. vol. xlvii. art. 12. and by M. Fontana, in Phil. Trans. vol. lxx. part i. Append. art. 2.; and also Fontana fur les Poisons, &c. Florence, 1806. See also Poison.

TIDE, or Tide, in Geography, a river of England, which passes by St. Germans, and runs into the Hanozae below Saltash.

TIDE, the name with time, or season. The word is originally Saxon, tid; which signifies the same. Tide, among Miners, denotes the space of twelve hours.

TIDE, Shrove. See Shrovet.

TIDE, Twelfth. See Twelfth.
TIDES.  

Tides, Whitson.  See Whitson-Tide.

Tides, two periodical motions of the waters of the sea; called also the flux and reflux, or the ebb and flow.

When the motion of the water is against the wind, it is called a windward-tide: when wind and tide go in the same direction, leeward-tide: when it runs very strong, it is called a tide-gate.

To tide it over or up into any place, is to go in with the tide, either ebb or flood, as long as that lasts; then to stay at anchor all the time of contrary tide; and thus to set in again with the return of the next tide.

It is said to flow-tide and half-tide, allowing fix hours to a tide, when the tide runs three hours in the ebb longer than it does by the shore; but, by longer, they do not mean its running more hours; but that, if it be high water a-shore at twelve, it will not be so in the ebbing till three. An hour and a half longer make tide and quarter-tide, three-fourths of an hour longer make tide and half-quarter tide, &c.

When the moon is in the first and third quarter, i.e. when she is new and full, the tides are high and swift, and are called spring-tides: when she is in the second and last quarter, the tides are lower and slower, and called neap-tides.

Tides, Phenomena of the.  The sea is observed to flow, for certain hours, from north towards south; in which motion, or flux, which lasts about six hours, the sea gradually swells: so that, entering the mouths of rivers, it drives back the river-waters toward their heads, or springs.

After a continual flux of six hours, the sea seems to rett for about a quarter of an hour; after which it begins to ebb or retire back again from north to south, for six hours more; in which time, the water sinking, the rivers return their natural course. Then, after a seeming pause of a quarter of an hour, the sea again begins to flow, as before; and thus alternately.

Thus does the sea ebb twice a day, and flow as often; but not in the same hours. The period of a flux and reflux is 12 hours 50½ minutes; so that the tides return later and later each day by 50½ minutes, which is the excess of a lunar day above a solar one, since 28½ lunar days are nearly equal to 29½ solar ones. So that the sea flows as often as the moon pales the meridian, both the arc above, and that below the horizon; and ebb as often as the pales the horizon, both the eastern and western point of it.

This farther agreement we observe between the moon and the sea, that the tides, though constant, are not equal; but are greatest, when the moon is in conjunction or opposition to the Sun, or at the time of new and full moon; and least, when in quadrature to it. This increase and diminution constitute the spring and neap tides: the augmentation becomes also still more observable when the moon is in its perigee, or nearest the earth. The lowest as well as the highest water is at the time of the spring-tides: the neap-tides neither rise so high nor fall so low.

Lastly, those tides are the greatest, which happen in the new and full moon, and the time of the equinoxes, while the moon is in its perigee. These tides are often still more increased by the equinoctial winds, which are sometimes so powerful as to produce a greater tide before or after the equinox than that which happens in the usual course, at the time of the equinox itself.

Add, that the same things are observed throughout most of the coasts of Europe; only that the tides are so much the less, and happen the later, as the coasts are the more northerly.

These phenomena of the tides are admirably accounted for, from the principle of gravitation. All we require to their solution is, that the earth and moon, and every particle of them, mutually gravitate towards each other: the reasonableness of which assumption, see under the article Gravity.

Indeed the sagacious Kepler, long ago, conjectured this to be the cause of the tides: "If," says he, "the earth ceased to attract its waters towards itself, all the water in the ocean would rise and flow into the moon: the sphere of the moon's attraction extends to our earth, and draws up the water." Thus thought Kepler, in his Introd. ad Theor. Mart. This surmise, for it was then no more, is now abundantly verified in the following theory, first amply deduced by Dr. Halley from the Newtonian principles.

However, we may observe with M. de la Lande (Astronomy, vol. iv. Paris, 1781.) that several of the ancients, and among others, Pliny, Ptolemy, and Macrobius, were acquainted with the influence of the sun and moon upon the tides. And Pliny says expressly, that the cause of the ebb and flow is in the sun, which attracts the waters of the ocean; and adds, that the waters rise in proportion to the proximity of the moon to the earth.

Tides, Theory of the.—It is obvious, that if the earth were entirely fluid, and quiescent, its particles, by their mutual gravity towards each other, would form themselves into the figure of an exact sphere.

Suppose, then, that some power acts on all the particles of this earth with an equal force, and in parallel directions, the whole mass will be moved by such a power, but its figure will suffer no alteration by it; because all the particles, being equally moved by this power in parallel lines, they will still keep the same situation with respect to each other, and still form a sphere, whose centre will have the same motion as each particle. Upon this supposition, if the motion of the earth round the common centre of gravity of the earth and moon were destroyed, and the earth were left to the influence of its gravitation toward the moon, the earth falling toward the moon would still retain its spheroidal figure; all the parts being equally carried on, and retaining therefore the same situation with respect to each other. But the effects of the moon's action, as well as the action itself, on different parts of the earth, are unequal, at all places within the angular distance of 79½ from the line passing through the attracting body, either in the nearer or in the remoter hemisphere: those parts, by the general law of gravity, being most attracted which are nearest the moon, and those being least attracted which are farthest from the moon; while the parts that are at a middle distance, are attracted by a mean degree of force; besides, all the parts are not acted on in parallel lines, but in lines directed towards the centre of the moon; and on these accounts the spheroidal figure of the earth must suffer some change from the moon's action.

Supposing the earth to fall towards the moon, and, abstracting from the mutual gravitation of its parts towards each other, and also from their cohesion; it will easily appear, that the parts nearest the moon would fall with the swiftest motion, being most attracted, and that they would leave the centre or greater bulk of the earth behind them in their fall, while the more remote parts would fall with the slowest motion, being least attracted than the rest, and be left a little behind the bulk of the earth, so as to be found at a greater distance from the centre of the earth than at the beginning of the motion. Whence it is manifest, that the earth would soon lose its spheroidal figure, and form itself into an oblong elliptic spheroid, whose longest diameter would point at the centre of the moon.
If the particles of the earth did not gravitate toward each other, but toward the moon only, the distances betwixt the parts of the earth that are supposed to be nearest the moon, and the central parts, would continually increase, because of their greater celerity in falling; and the distance betwixt the central parts, and the parts that are farthest from the moon, would increase continually at the same time; these being left behind by the central parts, which they would follow, but with a less velocity. Thus the figure of the earth would become more and more oblong, that diameter of it which pointed toward the moon continually increasing.

But there is another reason why the earth would soon assume an oblong spheroidal form, if its parts were allowed to fall freely by their gravity towards the moon's centre; for the lateral parts of the earth, or those which are at the distance of a quarter of a circle from the point which is directly below the moon, and the central parts depending with equal velocities toward the same point, viz. the centre of the moon, in approaching to it, would manifestly approach, at the same time, to each other; and their distance becoming less, the diameters of the earth passing through them would be diminished, so that the diameters of the earth that point toward the moon would increase, and those diameters of the earth that are perpendicular to the line joining the centres of the earth and moon, would decrease at the same time, and render the figure of the earth still more oblong for this reason.

Let us now allow the parts of the earth to gravitate towards its centre; and, as this gravitation far exceeds the action of the moon, and much more exceeds the differences of her actions on different parts of the earth, the effect resulting from the inequalities of these actions of the moon, will be only a small diminution of the gravity of those parts of the earth which it endeavoured in the former supposition to separate from its centre, and a small addition to the gravity of those parts which it endeavoured to bring nearer to its centre; that is, those parts of the earth which are nearest to the moon, and those which are farthest from her, will have their gravity toward the earth somewhat abated; whereas the lateral parts will have their gravity increased; so that if the earth be supposed fluid, the columns from the centre to the nearest, and from the farthest parts must rise, till, by their greater height, they be able to balance the other columns, whose gravity is either not so much diminished, or is increased by the inequalities of the action of the moon. And thus the figure of the earth must still be an oblong spheroid.

Let us now consider the earth, instead of falling toward the moon by its gravity, as projected in any direction, so as to move round the centre of gravity of the earth and moon; it is manifest, that the gravity of each particle toward the moon will endeavour to bring it as far from the tangent, in any small moment of time, as the earth were allowed to fall freely toward the moon; in the same manner as any projectile, at our earth, falls from the line of projection as far as it would fall by its gravity in the perpendicular in the same time. Consequentially the parts of the earth nearest to the moon will endeavour to fall farthest from the tangent, and those farthest from the moon will endeavour to fall least from the tangent, of all parts of the earth; and the earth will be the same as if the earth were free toward the moon; that is, the earth will still affect a spheroidal form, having its longest diameter directed toward the moon.

In order to understand this theory, it must be carefully considered, that it is not the action of the moon, but the inequalities in that action, that produce any variation from the spheroidal figure; and that if this action were the same in all the particles as in the central parts, and operating in the same direction, no such change would ensue.

For the farther illustration of the preceding observations, we must perceive that the waters at $Z$ (Plate 1, Geography, fig. 10.) on the side of the earth $ABCDEFGH$, next to the moon $M$, are more attracted than the central parts of the earth, $O$, by the moon, and the central parts are more attracted by her than the waters on the opposite side of the earth at $n$; and therefore the distance between the earth's centre and the waters on its surface, under and opposite to the moon, will be increased. For let $H_1, O$, and $D$ be three bodies, all equally attracted by the body $M$, and they will all move equally fast toward it, their mutual distances from each other continuing the same. If the attraction of $M$ is unequal, then that body which is most strongly attracted will move faster, and this will increase its distance from the other body. Consequentially, by the law of gravitation, $M$ will attract $H_1$ more strongly than it does $O$, by which the distance between $H_1$ and $O$ will be increased; and a spectator in $O$ will perceive $H_1$ rising higher toward $Z$. In like manner $O$, being more strongly attracted than $D$, will move farther toward $M$ than $D$ does; and therefore the distance between $O$ and $D$ will be increased; and a spectator in $O$, not perceiving his own motion, will see $D$ receding farther from him towards $n$; all effects and appearances being the same, whether $D$ recedes from $O$, or $O$ from $D$.

Suppose now there is a number of bodies, as $A$, $B$, $C$, $D$, $E$, $F$, $G$, $H$, placed round $O$, so as to form a flexible or fluid ring; then, as the whole is attracted toward $M$, the parts at $H$ and $D$ will have their distance from $O$ increased; whilst the parts at $B$ and $F$, being nearly at the same distance from $O$, will not recede from one another; but rather, by the oblique attraction of $M$, they will approach nearer to $O$. Hence the fluid ring will form itself into an ellipse $ZIBL n K F N Z$, whose longer axis $n O Z$ produced, will pass through $M$, and its shorter axis, $B O F$, will terminate in $B$ and $F$. Let the ring be filled with fluid particles, so as to form a sphere round $O$; then, as the whole moves toward $M$, the fluid sphere, being lengthened at $Z$ and $n$, will assume an oblong or oval form. If $M$ is the moon, $O$ the earth's centre, $ABCDEFGH$ the sea covering the earth's surface, it is evident that, whilst the earth by its gravity falls towards the moon, the water directly below her at $H$ will swell, and gradually rise toward her; and also the water at $D$ will recede from the centre, (or, fictionally speaking, the centre recedes from $D$,) and rise on the opposite side of the earth; whilst the water at $B$ and $F$ is deprefled, and falls below the former level. Hence, as the earth turns round its axis from the moon to the moon again in about 24½ hours, this oval of water must shift with it; and thus there will be two tides of flood and two of ebb in that time.

Some persons have found a difficulty in conceiving how, agreeably to the principles above stated, the earth can fall towards the moon by the power of gravity, when the moon is full, or in opposition to the sun; since the earth revolves about the sun, and must continually fall towards it; and if the earth is confluently falling towards the moon, they must at last come together. In order to obviate this difficulty, it has been suggested, that it is not the centre of the earth that describes the annual orbit round the sun, but the common centre of gravity of the earth and moon, the distance of which from the earth's centre, dividing 240,000 miles, the moon's distance from the earth, by 40, the excess of the earth's weight above that of the moon, is 6000 miles; and
TIDES.

that whilst the earth is moving round the sun, it also describes a circle round that centre of gravity, going as many times round it in one revolution about the sun as there are locations or courses of the moon round the fun in a year; and therefore the earth is constantly falling towards the moon from a tangent to the circle which it describes round the said common centre of gravity. Let \( M \) (fig. 11.) be the moon, \( T \) its orbit, and \( C \) the centre of gravity of the earth and moon; whilst the moon goes round her orbit, the centre of the earth describes the circle \( dqk \) round \( C \), to which circle \( guk \) is a tangent; and, therefore, when the moon has gone from \( M \) a little beyond \( W \), the earth has moved from \( q \) to \( e \), and in that time has fallen towards the moon, from the tangent at \( a \) to \( e \), and so on round the whole circle.

From the above reasoning it appears, that the parts of the earth directly under the moon, or that have the moon in their zenith, and also those in the nadir, or places diametrically opposite to each other, will have the flood, or highest water, at the same time. Moreover, those parts of the earth, where the moon appears in the horizon, or \( 90^\circ \) distant from the zenith and nadir, will have the ebb, or lowest waters.

It is evident that, by the motion of the earth on its axis, the most elevated part of the water is carried beyond the moon in the direction of the rotation. The water continues to rise after it has passed directly under the moon, though the immediate action of the moon there begins to decrease, and comes not to its greatest elevation till it has got half a quadrant farther. It continues also to descend after it has passed at \( 90^\circ \) distance from the point below the moon, though the force which the moon adds to its gravity begins to decrease there. For till the action of the moon adds to its gravity, and makes it descend till it has got half a quadrant farther; the greatest elevation, therefore, is not in the points which are in a line with the centres of the earth and moon, but about half a quadrant to the east of these points in the direction of the motion of rotation. Thus in open seas, where the water flows freely, the moon, \( M \), (fig. 10.) is generally past the north and fourth meridian, as at \( P \), when the high water is at \( Z \) and at \( J \); the reason of which is plain, because the moon acts with some force after it has passed the meridian, and thereby adds to the libration or waving motion, which the water acquired when the was in the meridian; and, therefore, the time of high water is not precisely at the time of her coming to the meridian, but some time after.

Besides, the tides answer not always to the same distance of the moon from the meridian at the same places; but are variously affected by the action of the sun, which brings them on sooner when the moon is in her first and third quarters, and keeps them back later when she is in her second and fourth; because, in the former case, the tide raised by the sun alone, would be earlier than the tide raised by the moon, and in the latter case later.

For the further illustration of the principle upon which lunar tides depend, we shall suppose, with Dr. Young, that the earth were wholly fluid, and the same part of its surface were always turned towards the moon; in which case, the pole of the spheroid being immediately under the moon, the lunar tide would remain stationary; the greatest elevation being at the points nearest to the moon and farthest from her, and the greatest depression in the circle equally distant from these points; the elevation, however, being twice as great as the depression, on account of the smaller surface to which it is confined. The actual height of this elevation would probably be about 40 inches, and the depression 20, making together a tide of five feet. If also the waters were capable of assuming instantly such a form as the equilibrium would require, the summit of a spheroid equally elevated would still be directed towards the moon, notwithstanding the earth's rotation. This may be called the primitive tide of the ocean; but on account of the perpetual change of place which is required for the accommodation of the surface to a similar position with respect to the moon, as the earth revolves, the form must be materially different from that of such a spheroid of equilibrium. The force employed in producing this accommodation, may be estimated by considering the actual surface of the sea as that of a wave moving on the spheroid of equilibrium, and producing in the water a sufficient velocity to preserve the actual form. We may deduce, says Dr. Young, from this mode of considering the subject, a theory of the tides which appears to be more simple and satisfactory than any which has yet been published; and by comparing the tides of narrower seas and lakes with the motions of pendulums suspended on vibrating centres, we may extend the theory to all possible cases.

If the centre of a pendulum be made to vibrate, the vibrations of the pendulum itself, when they have arrived at a state of permanence, will be performed in the same time with those of the centre; but the motion of the pendulum will be either in the same direction with that of the centre, or in a contrary direction, accordingly as the time of this forced vibration is longer or shorter than that of the natural vibration of the pendulum; and in the same manner it may be shown that the tides, either of an open ocean, or of a confined lake, may be either direct or inverted with respect to the primitive tide, which would be produced, if the waters always assumed the form of the spheroid of equilibrium, according to the depth of the ocean, and to the breadth as well as the depth of the lake. In the case of a direct tide, the time of the passage of the luminaries over the meridian must coincide with that of high water, and in the case of an inverted tide with that of low water.

In order that the lunar tides of an open ocean may be direct, or synchronous, its depth must be greater than 13 miles, and for the solar tides than 14. The less the depth exceeded these limits, the greater the tides would be, and in all cases they would be greater than the primitive tides. But in fact the height of the tides in the open ocean is always far short of that which would be produced in this manner; it is therefore improbable that the tides are ever direct in the open ocean, and that the depth of the sea is so great as 13 miles.

In order that the height of the inverted or remote lunar tides may be five feet, or equal to that of the primitive tides, the depth of the open sea must be 62 miles; and if the height is only two feet, which is perhaps not far from the truth, the depth must be 3\( \frac{1}{2} \) miles.

The tides of a lake or narrow sea differ materially from those of the open ocean, since the height of the water scarcely undergoes any variation in the middle of the lake; it must always be high water at the eastern extremity when it is low water at the western; and this must happen at the time when the places of high and low water, with respect to the primitive tides, are equally distant from the middle of the lake.

The tides may be direct in a lake 100 fathoms deep and less than 8\( \frac{1}{2} \) wide; but if it be much wider, they must be inverted. Supposing the depth a mile, they will be direct when the breadth is less than 25\( \frac{1}{2} \); but if a sea, like the Atlantic, were 50 or 60 degrees wide, it must be at least four miles deep, in order that the time of high water might coincide with that of the moon's rising.
TIDES.

free from all resistence; but where the tides are direct, they must be retarded by the effect of a resistence of any kind; and where they are inverted, they must be accelerated; a small resistence producing, in both cases, a considerable difference in the time of high water.

Where a considerable tide is observed in the middle of a limited portion of the sea, it must be derived from the effect of the elevation or depression of the ocean in its neighbourhood; and such derivative tides are probably combined in almost all cases with the oscillations belonging to each particular branch of the sea.

Lunar tides, the rise and progress of which are scientifically traced by Dr. Young, are subject, independently of the influence of the fun, to a variety of modifications, some of which we shall specify in the sequel of this article.

2. We have hitherto taken notice only of the action of the moon in producing tides; but it is manifest that, for the same reasons, the inequality of the fun's action on different parts of the earth would produce a like effect, and that this alone would cause a like variation from the exact spherical figure of a fluid earth. So that, in reality, there are two tides every natural day from the action of the sun, as there are in the lunar day from that of the moon, subject to the same laws; and the lunar tide, as we have observed, is somewhat changed by the action of the sun, and the change varies every day on account of the inequality between the natural and the lunar day. Indeed, the effect of the sun in producing tides, because of his immense distance, must be considerably less than that of the moon, though the gravity of the sun toward the earth be much greater, the solar tide being, as Dr. Young states it, only about two-fifths of the lunar.

For it is not the action of the sun or that of the moon, but the inequalities in the actions of each, which have any effect. The sun's distance is so great, that the diameter of the earth is as a point compared to it, and the difference between the action of the sun on the nearest and that on the farthest parts, becomes, on this account, vastly less than it would be if the sun were as near as the moon.

However, the immense bulk of the sun makes the effect still sensible, even at so great a distance; and, therefore, though the action of the moon has the greatest share in producing the tides, the action of the sun adds sensibly to it when they conpire together, as in the change and full of the moon, when they are nearly in the same line with the centre of the earth, and therefore unite their forces. Thus, in conjunction, or when the sun and moon are on the same side of the earth, they both conpire to raise the water in the zenith, and consequently in the nadir; and when they are in opposition, that is, when the earth is between them, whilst one makes high water in the zenith and nadir, the other does the same in the nadir and zenith. Consequently, in the syzygies, or at new and full moon, the tides are the greatest, and are what we call the spring-tides. Moreover, the action of the sun diminishes the effect of the moon's action in the first and last quarters, because the one raises the water in that case where the other depresses it; and therefore, in the quadratures the tides are the least, and are called neap-tides.

As the lunar tide is much larger than the solar tide, the former must always determine the time of high and low water, which, in the spring and neap-tides, remains unaltered by the effect of the sun; so that in the neap-tides the actual time of low water is that of the solar high water; but at the intermediate times, the lunar high water is more or less accelerated or retarded. The progress of this alteration may easily be traced by means of a simple construction. If we make a triangle, of which two of the sides are two feet and five feet in length, the external angle which they form being equal to twice the distance of the luminaries, the third side will show precisely the magnitude of the compound tide, and the halves of the two angles opposite to the first two sides the acceleration, or retardation, of the times of high water belonging to the separate tides respectively. Hence it appears that the greatest deviation of the joint tide from the lunar tide amounts to $11^\circ 48'$ in longitude, and the time corresponding to 47 minutes, supposing the proportion of the forces to remain always the same; but in fact the forces increase in proportion as the cubes of the distances of their respective luminaries diminish, as well as from other causes; and in order to determine their joint effects, the lengths of the sides of the triangle must be varied accordingly. In some ports, from a combination of circumstances in the channel, by which the tides reach them, or in the seas, in which they originate, the influence of the sun and moon may acquire a proportion somewhat different from that which naturally belongs to them; thus at Breth, the influence of the moon appears to be three times as great as that of the sun; when it is usually only twice as great.

Sir Isaac Newton has calculated the effects of the sun and moon respectively upon the tides from their attractive powers. The augmentation of the gravity of the lateral parts of the earth, produced by the action of the sun, is a similar effect to an augmentation, estimated by him on another occasion, that is made to the gravity of the moon toward the earth by the same action; and when the moon is in the quarters; only the addition made to the gravity of the lateral parts is about $66^\circ$ times less, because their distance from the earth's centre is so many times less than the distance of the moon from it. The gravity of these parts of the earth that are directly beneath the sun, and of those opposite to it, is diminished by a double quantity of what is added to the lateral parts; and as the diminution of gravity of the one, and augmentation of gravity of the other, confpire together in raising the water under the sun, and the parts opposite to it, above its height in the lateral parts; the whole force that produces this effect is to be considered as triple of what is added to the gravity of the lateral parts; and is hence found to be to the gravity of the particles as $1$ to $128085206$, and to the centrifugal force at the equator as $1$ to $44527$. The elevation of the waters by this force is considered by Newton as an effect similar to the elevation of the equatorial parts above the polar parts of the earth, arising from the centrifugal force at the equator; and, being $44527$ times less, is found to be $1$ foot and $11\frac{3}{4}$ inches, Paris measure. This is the elevation arising from the action of the sun upon the water.

Mr. Maclaurin makes this elevation to be $1$ foot $10\frac{2}{3}$ inches, of the same measure, which differs from the above estimate by the $\frac{1}{4}$ part of an inch; and the greatest elevation, when the sun is in the equinoctial, $1$ foot $11\frac{3}{4}$ inches.

In order to find the force of the moon upon the water, Newton compares the spring-tides, at the mouth of the river Avon, below Bristol, with the neap-tides there, and finds their proportion to be that of $9$ to $5$; whence, after several necessary corrections, he concludes, that the force of the moon is to that of the sun, in raising the waters of the ocean, as $4\cdot 4815$ to $1$; so that the force of the moon is, of itself, to produce an elevation of $8$ feet and $7\frac{3}{4}$ inches, and the sun and moon together may produce an elevation of about $10\frac{3}{4}$ feet, in their mean distances from the earth, and an elevation of about $12$ feet, when the moon
TIDES.

The height to which the water rises and falls, upon coasts of the open and deep ocean, is agreeable enough to this computation.


The greatest heat is not on the solstitial day, when the immediate action of the sun is greatest, but some time after.

Thus would for some time continue in an agitation like to that in which it is at present. The waves of the sea, that continue after a storm ceases, and every motion almost of a fluid, may illustrate this.

The refraction of fluids, in general, says Dr. Young, is as the square of the velocity, consequently it must be much greater for the lunar than for the solar tide, in proportion to the magnitude of the force; and the acceleration of the lunar tide produced by this cause must be greater than that of the solar; hence it may happen, that when the lunar tide occurs two or three hours after the transit of the moon, the solar tide may be three or four hours after that of the sun, so as to be about an hour later, at the times of conjunction and opposition, and the tides will be highest when the moon passes the meridian about an hour after the sun; while at the precise time of the new and full moon, the lunar tide will be retarded about a quarter of an hour by the effect of the solar tide.

The different distances of the moon from the earth produce a sensible variation in the tides. When the moon approaches the earth, her action on every part increases, and the differences of that action on which the tides depend, increase. For her action increases as the squares of the distances decrease; and though the differences of the distances themselves be equal, yet there is a greater disproportion between the squares of les than the squares of greater quantities; e. g. 3 exceeds 2, as much as 2 exceeds 1; but the square of 2 is quadruple of the square of 1, while the square of 3 (viz. 9) is little more than double the square of 2 (viz. 4).

Thus it appears, that by the moon's approach, her action on the nearest parts increases more quickly than her action on the remote parts; and the tides, therefore, increase in a higher proportion as the distances of the moon decrease.

Sir Isaac Newton shews, that the tides increase in proportion as the cubes of the distances decrease, so that the moon, one half her present distance, would produce a tide eight times greater.

The moon describes an ellipse about the earth, and in her nearest distance produces a tide sensibly greater than at her greatest distance from the earth; and hence it is, that two great spring-tides never succeed each other immediately; for if the moon be at her nearest distance from the earth at the change, the must be at her greatest distance at the full, having, in the intervening time, finished half a revolution; and, therefore, the spring-tide then will be much less than the tide at the change was: and for the same reason, if a great spring-tide happens at the time of full moon, the tide at the ensuing change will be less.

The spring-tides are greatest about the time of the equinoxes, i. e. about the latter end of March and September, and about the time of the solstices, i. e. toward the end of June and December; and the neap-tides are least at the equinoxes and greatest at the solstices; so that the difference between the spring and the neap-tides is much less considerable at the solstitial than at the equinoctial seasons. In order to illustrate and evince the truth of this observation, it is manifest, that if either the sun or moon were in the pole, they could have no effect on the tides, for their action would raise all the water at the equator to the same height, and any place of the earth, in describing its parallel to the equator, would not meet, in its course, with any part of the water more elevated than another, so that there could be no tide in any place.

The effect of the sun or moon is greatest when in the equinoctial; for then the axis of the spheroidal figure, arising from their action, moves in the greatest circle, and the water is put into the greatest agitation; and hence it is that the spring-tides produced, when the sun and moon are both in the equinoctial, are the greatest of any, and the neap-tides are the least of any, about that time.

But the tides produced when the sun is in either of the tropics, and the moon in either of her quarters, are greater than those produced when the sun is in the equinoctial, and the moon in her quarters, because, in the first case, the moon is in the equinoctial, and in the latter case, the moon is in one of the tropics; and the tide depends more on the action of the moon than of the sun, and is, therefore, greatest when the moon's action is greatest.

However, it is necessary to observe, that, because the sun is nearer the earth in winter than in summer, i. e. in February and October than in March and September, the greatest spring-tides are after the autumnal, and before the vernal equinox.

Since the greatest of the two tides happening in diurnal revolution of the moon, or lunar day, i. e. about 24h 50m, is that in which the moon is nearest the zenith, or nadir; for this reason, while the sun is in the northern signs, the greater of the two diurnal tides in our climates, is that arising from the moon above the horizon: when the sun is in the southern signs, the greater is that arising from the moon below the horizon.

In proof of this observation, let it be considered, that when the moon declines from the equator toward either pole, one of the greatest elevations of the water follows the moon, and describes nearly the parallel on the earth's surface which is under that which the moon, on account of the diurnal motion, seems to describe; and the opposite greatest elevation, being antipodal to that, must describe a parallel as far on the other side of the equator; so that while the one moves on the north side of the equator, the other moves on the south side of it, at the same distance.

Now the greatest elevation which moves on the same side of the equator, with any place, will come nearer to it than the opposite elevation, which moves in a parallel on the other side of the equator; and, therefore, if a place is on the same
side of the equator with the moon, the day-tide, or that which is produced while the moon is above the horizon of the place, will exceed the night-tide, or that which is produced while the moon is under the horizon of the place. It is the contrary if the moon is on one side, and the place on the other side of the equator; for then the elevation which is opposite to the moon, moves on the same side of the equator with the place, and, therefore, will come nearer to it than the other elevation. The difference will be greatest when the sun and moon both describe the tropics; because the two elevations in that case describe the opposite tropics, which are the farthest from each other of any two parallel circles they can describe. Thus it is found, by observation, that the evening tides in the summer exceed the morning tides, and the morning tides in winter exceed the evening tides. The difference is found at Bristol to amount to fifteen inches, and at Plymouth to one foot. It would be still greater, but that a fluid always retains an impressed motion for some time; so that the preceding tides affect always those that follow them. Upon the whole, while the moon has north declination, the greatest tides in the northern hemisphere are when she is above the horizon, and the reverse while her declination is south.

To illustrate this matter by figures; let $NESQ$ (fig. 12, 13, 14.) be the earth, $NCS$ its axis, $EQ$ the equator, $T\theta$ the tropic of Cancer, $t\varphi$ the tropic of Capricorn, $ab$ the arctic circle, $cd$ the antarctic, $N$ the north pole, $S$ the south pole, $M$ the moon, $F$ and $G$ the two eminences of water, whose lower parts are at $a$ and $d$ (fig. 12), at $N$ and $S$ (fig. 13.), and at $b$ and $e$ (fig. 14.), always $90^\circ$ from the highest.

Now, when the moon is in her greatest north declination at $M$ (fig. 12.), the highest elevation, $G$, under her is on the tropic of Cancer, $T\theta$, and the opposite elevation, $F$, on the tropic of Capricorn, $t\varphi$; and these two elevations describe the tides by the earth's diurnal rotation. All places in the northern hemisphere, $ENQ$, have the highest tides when they come into the position $b\equiv Q$, under the moon; and the lowest tides when the earth's diurnal rotation carries them into the position $a\equiv F$, on the side opposite to the moon: the reverse happens at the same time in the southern hemisphere $ESQ$, as is evident to sight. The axis of the tides $ac\equiv d$ has now its poles $a$ and $d$ (being always $90^\circ$ from the highest elevations) in the arctic and antarctic circles; and, therefore, it is plain, that at these circles there is but one tide of flood, and one of ebb, in the lunar day. For when the point $a$ revolves half round to $b$ in twelve lunar hours, it has a tide of flood; but when it comes to the same point $a$ again in twelve hours more, it has the lowest ebb. In seven days afterward, the moon $M$ (fig. 13.) comes to the equinoctial circle, and is over the equator $E\equiv Q$, when both elevations describe the equator; and in both hemispheres, at equal distances from the equator, the tides are equally high in both parts of the lunar day. All the phenomena being reversed, when the moon has south declination, to what they were when her declination was north, require no farther description, fig. 14.

From what has been said it appears, that as the tides are governed by the moon, they must turn on the axis of the moon's orbit, which is inclined $23\frac{1}{2}$ degrees to the earth's axis at a mean rate; and, therefore, the poles of the tides must be so many degrees from the poles of the earth, or in opposite points of the polar circles, going round these circles in every lunar day. It is true that, according to fig. 14., when the moon is vertical to the equator $EQ$, the poles of the tides seem to fall in with the poles of the world $N$ and $S$; but when we consider that $FGH$ is under the moon's orbit, it will appear that when the moon is over $H$, in the tropic of Capricorn, the north pole of the tides (which can be no more than $90^\circ$ from under the moon) must be at $C$ in the arctic circle, not at $P$, the north pole of the earth; and as the moon ascends from $H$ to $G$ in her orbit, the north pole of the tides must shift from $c$ to $a$ in the arctic circle, and the south pole as much in the antarctic.

It is not to be doubted, but that the earth's quick rotation brings the poles of the tides nearer to the poles of the world than they would be if the earth were at rest, and the moon revolved about it only once a month; for, otherwise, the tides would be more unequal in their heights, and times of their returns, than we find they are. But how near the earth's rotation may bring the poles of its axis and those of the tides together, or how far the preceding tides may affect those which follow, is to make them keep up nearly to the same heights, and times of ebbing and flowing, is a problem more fit to be solved by observation than by theory.

Those who have opportunity to make observations, and choose to satisfy themselves whether the tides are really affected in the above manner by the different positions of the moon, especially as to the unequal times of their returns, may take this general rule for knowing when they ought to be so affected. When the earth's axis inclines to the moon, the northern tides, if not retarded in their passage through shoals and channels, nor affected by the winds, ought to be greatest when the moon is above the horizon, least when she is below it; and quite the reverse when the earth's axis declines from her; but in both cases at equal intervals of time. When the earth's axis inclines sideways to the moon, both tides are equally high, but they happen at unequal intervals of time. In every vibration the earth's axis inclines once to the moon, once from her, and twice sideways to her, as it does to the sun every year; because the moon goes round the ecliptic every month, and the sun once in a year. In summer, the earth's axis inclines towards the moon when new; and, therefore, the dry-tides in the north ought to be highest, and night-tides lowest about the change; at the full the reverse. At the quarters they ought to be equally high, but unequal in their returns; because the earth's axis then inclines sidewise to the moon. In winter the phenomena are the same at full moon as in summer at new. In autumn the earth's axis inclines sidewise to the moon when new and full; therefore the tides ought to be equally high and unequal in their returns at these times. At the first quarter the tides of flood should be least when the moon is above the horizon, greatest when she is below it, and the reverse at her third quarter. In spring, the phenomena of the first quarter answer to those of the third quarter in autumn, and vice versa. The nearer any time is to either of these seasons, the more the tides partake of the phenomena of these seasons; and in the middle between any two of them, the tides are at a mean state between those of both.

8. Such would the tides regularly be, if the earth were all over covered with sea very deep, so that the water might follow the influence of the sun and moon; but, by reason of the shallowns of some places, and the narrowness of the straits in others, by which the tides are propagated, there arises a great diversity in the effect, not to be accounted for, without an exact knowledge of all the circumstances of the places; such as the position of the land, and the breadth and depth of the channels, direction of the winds, &c. For a very slow and imperceptible motion of the whole body of water,
TIDES.

The tide entering the Atlantic appears, says Dr. Young, to advance northwards at the rate of about 500 miles an hour, corresponding to a depth of about three miles, so as to reach Sierra Leone at the eighth hour after the moon's southing; this part of Africa being not very remote from the meridian of the middle of the South Atlantic ocean, and having little share in the primitive tides of that ocean. The southern tide seems to pass by Cape Blanco and Cape Bojador, to arrive at Gibraltar at the thirteenth hour, and to unite its effects with those of other tides at various parts of the coasts of Europe.

We may therefore consider the Atlantic as a detached sea, about 3500 miles broad, and three miles deep; and a sea of these dimensions is susceptible of tides considerably larger than those of the ocean, but how much larger we cannot determine without more accurate measures. These tides would happen on the European coasts, if there were no resistance, a little less than five hours after the moon's southing, and on the coast of America, a little more than seven hours after; but the resistance opposed to the motion of the tide may easily accelerate the time of high-water in both cases about two hours, so that it may be a little before the third hour on the western coasts of Europe and of Africa, and before the fifth on the most exposed parts of the eastern coast of America; and in the whole of the Atlantic, this tide may be combined more or less both with the general southern tide, and with the partial effects of local elevations or depressions of the bottom of the sea, which may cause irregularities of various kinds. The southern tide is, however, probably less considerable than has sometimes been supposed, for, in the latitudes in which it must originate, the extent of the elevation can only be half as great as at the equator; and the islands of Kerguelen's land and South Georgia, in the latitudes of about 50° and 55°, have their tides delayed till the tenth and eleventh hours, apparently because they received them principally from distant parts of the ocean, which are nearer to the equator.

On the western coasts of Europe, from Ireland to Cadiz; on those of Africa, from Cape Coast to the Cape of Good Hope; and on the coast of America, from California to the frontiers of Magellan, as well as in the neighbouring islands; it is usually high-water at some time between two and four hours after the moon's southing; on the eastern coast of South America, between four and six; on that of North America, between seven and eleven; and on the eastern coasts of Asia and New Holland, between four and eight. The Society Islands are perhaps too near the middle of the Pacific ocean to partake of the effects of its primitive tide, and their tide, being secondary, is probably for this reason a few hours later. At the Almirantaz, near the eastern coast of Africa, the tide is at the fifth hour; but there seem to be some irregularities in the tides of the neighbouring islands.

The progress of a tide may be very distinctly traced from its source in the ocean into the narrow and shallow branches of the sea which constitute our channels. Thus the tide is an hour or two later at the Seilly Islands than in the Atlantic, at Plymouth three, at Cork, Bristol, and Weymouth four, at Caen and Havre five, at Dublin and Bightelmestone seven, at Boulogne and Liverpool eight, at Dover near nine, at the Nore eleven, and at London-bridge twelve and a half. Another portion appears to proceed round Ireland and Scotland into the North sea; it arrives from the Atlantic at Londonderry in about three hours, at the Orkneys in fix, at Aberdeen in eleven, at Leith in fourteen, at Leoboffe in twenty, and at the Nore in about twenty-four, so as to meet there the subsequent tide coming from the south. From the time occupied by the tide in travelling from the mouth of the English Channel

water, where it is (for example) two miles deep, will suffice to raise its surface ten or twelve feet in a tide's time; whereas, if the same quantity of water were to be conveyed through a channel forty fathoms deep, it would require a very great stream to effect it in fo large inlets as are the channel of England and the German ocean; whence the tide is found to flow strongest in those places where the sea grows narrower, the same quantity of water being, in that case, to pass through a smaller passage.

This is most evident in the straits between Portland and Cape la Hogue in Normandy, where the tide runs like a gulf; and would be yet more between Dover and Calais, if the tide, coming round the island, did not check it.

This force, being once impressed upon the water, continues to carry it above the level of the ordinary height of the ocean, particularly where the water meets a direct obstacle, as it does in St. Malo's; and where it enters into a long channel, which running far into the land, grows very straight at its extremity, as it does into the Severn sea at Chepstow, where the tide rises to 40 feet, and Bridgol, where its height is 50 feet. At Brest, the height of the tides is about 20 feet; at St. Malo's, 50; at Annapolis, in the bay of Fundy, as much sometimes as 100 feet. In the Mediterranean, the tides are generally inconsiderable; nevertheless, they are perceptible: at Naples, they sometimes rise to a foot; at Venice, to more than two feet; and in the Euphrates, for a certain number of days in each lunation, they are very distinctly observable from the current which they occasion. In the West Indies, and also in the gulf of Mexico, the tides are less observable than in the neighbouring seas, perhaps on account of some combinations derived from the variations of the depth of the rivers, and from the different channels by which they are propagated.

The shallows of the sea, and the intercurrent continents, are the reasons that in the open ocean the tides rise but to very small heights in proportion to what they do in wide-mouthed rivers, opening in the direction of the stream of the tide; and that high-water is not at the time of the moon's appulse to the meridian, but always some hours after it, as it is observed upon all the western coasts of Europe and Africa, from Ireland to the Cape of Good Hope; in all which a south-west moon makes high water; and the same is reported to hold in the west of America.

So that tides happen at different places at all distances of the moon from the meridian, and consequently at all hours of the lunar day.

It is to be considered that, in order to allow the tides their full motion, the ocean, in which they are produced, ought to be extended from east to west 90° at least. Because the places, where the moon rises, molt, and most depresses the water, are at that distance from each other. Hence it appears, that it is only in the great oceans that such tides can be produced, and why in the larger Pacific ocean they exceed those in the Atlantic ocean. Hence also it is obvious, why the tides are not so great in the torrid zone, between Africa and America, where the ocean is narrower, as in the temperate zones on either side; and we may hence also understand, why the tides are so small in islands that are very far distant from the shores. It is manifest, that, in the Atlantic ocean, the water cannot rise on one shore but by defecding on the other; so that, at the intermediate distant islands, it must continue at a mean height between its elevation on one and on the other shore. But when tides pass over shoals, and through straits into bays of the sea, their motion becomes more various, and their height depends on many circumstances.
TIDES.

Channel to Boulogne, at the rate of about fifty miles an hour, we may calculate that the mean depth of the channel is about twenty-eight fathoms, independently of the magnitude of the refractions of various kinds to be overcome, which require us to suppose the depth from thirty to forty fathoms. In the great river of Amazons, the effects of the tides are still sensible at the estuaries of Pausias, 500 miles from the sea, after an interval of several days spent in their passage up: for the slower progressive motion of the water, no more impedes the progress of a wave against the stream, than the velocity of the wind prevents the transmission of sound in a contrary direction.

Dr. Young observes, that fearfully a single influence occurs that favours the supposition of high water in the open sea being within an hour of the moon's rising, as it must if the depth were very great; so that neither the height of the tide, nor the time of high-water, will allow us to suppose the sea at any place quite so deep as four miles.

The tide that is produced on the western coasts of Europe, in the Atlantic, corresponds to the situation of the moon already described. Thus it is high-water on the coasts of Spain, Portugal, and the west of Ireland, about the third hour after the moon has passed the meridian; from thence it flows into the adjacent channels, as it finds the ebbier passage. One current from it, e.g., runs up by the south of England, another comes in by the north of Scotland; they take a considerable time to move all this way, and it is high-water sooner in the places to which they first come, and it begins to fall at those places, while they are still going on to others that are farther in their course. As they return, they are not able to raise the tide, because the water runs faster off than it returns, till, by a new tide propagated from the open ocean, the return of the current is stopped, and the water begins to rise again. The tide, propagated by the moon in the German Ocean, when the sun is three hours past the meridian, takes about twelve hours to come from thence to London bridge; so that when it is high-water there, a new tide is already come to its height in the ocean; and, in some intermediate place, it must be low water at the same time.

Consequently, when the moon has north declination, and we should expect the tide at London to be the greatest when the moon is above the horizon, we find it is less; and the contrary when the sun has south declination.

At several places it is high-water three hours before the moon comes to the meridian; but that tide which the moon pulls, as it were, before her, is only the tide opposite to that which was raised by her when she was nine hours past the opposite meridian.

It would be endless to recount all the particular solutions which are easy corollaries from this doctrine: as why the lakes and seas, such as the Caspian sea and the Mediterranean sea, the Black sea and Baltic, have either small or no very sensible tides: for lakes are generally so small, that when the moon is vertical the affects every part of them alike, and therefore no part of the water can be raised higher than another; and having no communication with the ocean, it can neither increase nor diminish their water, in order to rise and fall; and seas that communicate by such narrow inlets, and are of so immense an extent, cannot, in a few hours time, receive and empty water enough to raise or sink their surface any thing sensibly.

To demonstrate the excellence of this doctrine, the example of the tides in the port of Bathy, in the kingdom of Tonquin, in the East Indies, 20° 50' N. lat. which are so extraordinary and different from all others we have yet heard of, may suffice.

The day in which the moon passes the equinoctial, the water flagonates there without any motion; as the moon removes from the equinoctial, the water begins to rise and fall once a day; and it is high-water at the setting of the moon, and low-water at her rising. This daily tide increases for about seven or eight days, and then decreases for as many days by the same degree, till this motion ceases, when the moon has returned to the equinoctial. When she has passed the equinoctial, and declines toward the south pole, the water rises and falls again as before; but it is high-water now at the rising, and low-water at the setting of the moon.

Sir Isaac Newton, in order to account for this extraordinary tide, considers that there are two inlets to this port of Bathy, one from the Chinese ocean, betwixt the continent and the Mainillas, the other from the Indian Ocean, betwixt the continent and Borneo. This leads him to propose, as a solution of this phenomenon, that a tide may arrive at Bathy, through one of these inlets, at the third hour of the moon, and another through the other inlet six hours after, at the ninth hour of the moon. For, while these tides are equal, the one flowing in as the other ebbs out, the water must flagonate; now they are equal when the moon is in the equinoctial; but as soon as the moon begins to decline on the same side of the equator with Bathia, it has been found that the diurnal tide must exceed the nocturnal, so that two greater and two lesser tides must arrive at Bathia by turns.

The difference of these will produce an agitation of the water, which will rise to its greatest height at the mean time betwixt the two greater tides, and fall lowest at a mean time betwixt the two lesser tides; so that it will be high-water about the sixth hour at the setting of the moon, and low-water at her rising. When the moon has got to the other side of the equinoctial, the nocturnal tide will exceed the diurnal; and, therefore, the high-water will be at the rising, and low-water at the setting of the moon.

The same principles will serve to account for other extraordinary tides, which, we are told, are observed in places whose situation exposeth them to such irregularities: and, as some think, for particular currents and winds. See Currents and Winds.

When the time of high-water at any place is, in general, mentioned, it is to be understood on the days of the fitness of the moon, or days of new and full moon; when the sun and moon pass the meridian of the place at the same time. Among pilots, it is customary to reckon the time of high, or high-water, by the point of the compass the moon bears on, allowing a quarter of an hour for each point, at that time: thus, on the full and change days, in places where it is flood at noon, the tide is said to flow N. and S., or at 12 o'clock; in other places, on the same days, where the moon bears S. or W. of the meridian, when it is high-water, the tide is said to flow on such point; thus, if the moon bears S. or W. of the meridian, that is, at 9 o'clock; if it bears S. or W. it flows S. or W. and S. or W. or at three hours after the meridian; and, in like manner for other points of the moon's bearing.

The times of high-water in any place fall about the same hours after a period of about fifteen days, or between one spring-tide and another; but during that period, the times of high-water fall each day later by about forty-eight minutes.

From the observations of many persons there have been collected the times when it is high-water on the days of the new and full moon, on most of the sea-coasts of Europe, and many other places; which are usually put in a table against the names of the places; a specimen of which is subjoined.

A Table
A Table of the Times of High-Water on the Days of the New and Full Moon, on most of the Sea-Coasts of Europe.

<table>
<thead>
<tr>
<th>Names of Places</th>
<th>Countries</th>
<th>Coasts</th>
<th>High-Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abbrevak</td>
<td>France</td>
<td>English Channel</td>
<td>4 00</td>
</tr>
<tr>
<td>Aberdeen</td>
<td>Scotland</td>
<td>English Channel</td>
<td>0 45</td>
</tr>
<tr>
<td>Aldborough</td>
<td>England</td>
<td>Ditto</td>
<td>9 45</td>
</tr>
<tr>
<td>Alderney, Isle of</td>
<td>Ditto</td>
<td>English Channel</td>
<td>12 0</td>
</tr>
<tr>
<td>Amazon, River (Mouth)</td>
<td>Amazon</td>
<td>Atlantic Ocean</td>
<td>6 0</td>
</tr>
<tr>
<td>Ameyland, Isle of</td>
<td>Dutchland</td>
<td>German Ocean</td>
<td>7 30</td>
</tr>
<tr>
<td>Amsterdam</td>
<td>Ditto</td>
<td>Ditto</td>
<td>3 0</td>
</tr>
<tr>
<td>Andrews, St.</td>
<td>Scotland</td>
<td>Ditto</td>
<td>2 15</td>
</tr>
<tr>
<td>Anholt, Isle of</td>
<td>Denmark</td>
<td>Sound</td>
<td>0 0</td>
</tr>
<tr>
<td>Antwerp</td>
<td>Flanders</td>
<td>River Schelde</td>
<td>6 0</td>
</tr>
<tr>
<td>Archangel</td>
<td>Russia</td>
<td>White Sea</td>
<td>6 0</td>
</tr>
<tr>
<td>Arran, Isle of</td>
<td>Ireland</td>
<td>St. George's Channel</td>
<td>11 0</td>
</tr>
<tr>
<td>Ashley, River</td>
<td>Carolina</td>
<td>Atlantic Ocean</td>
<td>0 45</td>
</tr>
<tr>
<td>Augustine, St.</td>
<td>Florida</td>
<td>Ditto</td>
<td>4 30</td>
</tr>
<tr>
<td>Baltimore</td>
<td>Ireland</td>
<td>Western Ocean</td>
<td>4 30</td>
</tr>
<tr>
<td>Barleu, Cape</td>
<td>France</td>
<td>English Channel</td>
<td>7 30</td>
</tr>
<tr>
<td>Bas, Isle de</td>
<td>Ditto</td>
<td>Ditto</td>
<td>3 45</td>
</tr>
<tr>
<td>Bayonne</td>
<td>Ditto</td>
<td>Bay of Biscay</td>
<td>3 30</td>
</tr>
<tr>
<td>Beachy-Head</td>
<td>England</td>
<td>English Channel</td>
<td>0 0</td>
</tr>
<tr>
<td>Bear, North</td>
<td>Labrador</td>
<td>Hudson's Bay</td>
<td>12 0</td>
</tr>
<tr>
<td>Bear, South</td>
<td>Ireland</td>
<td>Irish Sea</td>
<td>10 0</td>
</tr>
<tr>
<td>Belfast</td>
<td>France</td>
<td>Bay of Biscay</td>
<td>3 30</td>
</tr>
<tr>
<td>Belleisle</td>
<td>Bahamas</td>
<td>Atlantic Ocean</td>
<td>7 0</td>
</tr>
<tr>
<td>Bermudas, Island of</td>
<td>England</td>
<td>German Ocean</td>
<td>2 30</td>
</tr>
<tr>
<td>Berwick</td>
<td>Acadia</td>
<td>River St. Lawrence</td>
<td>2 0</td>
</tr>
<tr>
<td>Bic, Isle du</td>
<td>England</td>
<td>German Ocean</td>
<td>6 0</td>
</tr>
<tr>
<td>Blackney</td>
<td>France</td>
<td>English Channel</td>
<td>9 45</td>
</tr>
<tr>
<td>Blanchart-Race</td>
<td>Negroland</td>
<td>Atlantic Ocean</td>
<td>0 0</td>
</tr>
<tr>
<td>Blanco, Cape</td>
<td>Ditto</td>
<td>Ditto</td>
<td>0 0</td>
</tr>
<tr>
<td>Bojador, Cape</td>
<td>France</td>
<td>English Channel</td>
<td>10 30</td>
</tr>
<tr>
<td>Boulogne</td>
<td>Ditto</td>
<td>Bay of Biscay</td>
<td>3 0</td>
</tr>
<tr>
<td>Bourdeaux</td>
<td>Dutchland</td>
<td>German Ocean</td>
<td>4 30</td>
</tr>
<tr>
<td>Beechfond</td>
<td>Germany</td>
<td>River Wefer</td>
<td>6 0</td>
</tr>
<tr>
<td>Bremen</td>
<td>France</td>
<td>Bay of Biscay</td>
<td>3 45</td>
</tr>
<tr>
<td>Breit</td>
<td>England</td>
<td>German Ocean</td>
<td>3 45</td>
</tr>
<tr>
<td>Bridlington Bay</td>
<td>Ditto</td>
<td>Ditto</td>
<td>1 30</td>
</tr>
<tr>
<td>Brill</td>
<td>England</td>
<td>St. George's Channel</td>
<td>6 45</td>
</tr>
<tr>
<td>Bristol</td>
<td>Scotland</td>
<td>German Ocean</td>
<td>3 0</td>
</tr>
<tr>
<td>Buchannels</td>
<td>North Britain</td>
<td>Hudson's Straits</td>
<td>6 50</td>
</tr>
<tr>
<td>Button's Isles</td>
<td>Spain</td>
<td>Atlantic Ocean</td>
<td>4 30</td>
</tr>
<tr>
<td>Cadiz</td>
<td>France</td>
<td>English Channel</td>
<td>9 0</td>
</tr>
<tr>
<td>Caen</td>
<td>Scotland</td>
<td>Western Ocean</td>
<td>0 0</td>
</tr>
<tr>
<td>Caithnes Point</td>
<td>Scotland</td>
<td>English Channel</td>
<td>11 30</td>
</tr>
<tr>
<td>Calais</td>
<td>France</td>
<td>St. George's Channel</td>
<td>5 15</td>
</tr>
<tr>
<td>Caldy, Isle of</td>
<td>England</td>
<td>German Ocean</td>
<td>1 30</td>
</tr>
<tr>
<td>Camber</td>
<td>Dutchland</td>
<td>Atlantic Ocean</td>
<td>3 0</td>
</tr>
<tr>
<td>Canaria, Isle of</td>
<td>Canaries</td>
<td>Ditto</td>
<td>0 0</td>
</tr>
<tr>
<td>Cantin, Cape</td>
<td>Barbary</td>
<td>English Channel</td>
<td>8 15</td>
</tr>
<tr>
<td>Calcots</td>
<td>Guernsey</td>
<td>Hudson's Straits</td>
<td>10 15</td>
</tr>
<tr>
<td>Charles, Isle of</td>
<td>Labrador</td>
<td>Ashely River</td>
<td>3 0</td>
</tr>
<tr>
<td>Charles-Town</td>
<td>Carolina</td>
<td>Bay of Fundy</td>
<td>0 45</td>
</tr>
<tr>
<td>Chigné-Euw</td>
<td>Nova Scotia</td>
<td>English Channel</td>
<td>7 30</td>
</tr>
<tr>
<td>Cherbourg</td>
<td>France</td>
<td>Hudson's Bay</td>
<td>7 20</td>
</tr>
<tr>
<td>Churchill, Cape and River</td>
<td>North Wales</td>
<td>Western Ocean</td>
<td>4 30</td>
</tr>
<tr>
<td>Clear, Cape</td>
<td>Ireland</td>
<td>Bay of Biscay</td>
<td>3 0</td>
</tr>
<tr>
<td>Concarneau</td>
<td>France</td>
<td>Bay of Biscay</td>
<td>3 0</td>
</tr>
</tbody>
</table>
## TIDES.

<table>
<thead>
<tr>
<th>Names of Places</th>
<th>Countries</th>
<th>Coast</th>
<th>High-Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conquet</td>
<td>France</td>
<td>English Channel</td>
<td>2.15</td>
</tr>
<tr>
<td>Coquet, Isle of</td>
<td>England</td>
<td>German Ocean</td>
<td>3.0</td>
</tr>
<tr>
<td>Corke</td>
<td>Ireland</td>
<td>St. George's Channel</td>
<td>6.30</td>
</tr>
<tr>
<td>Corfe, Cape</td>
<td>Guinea</td>
<td>Ethiopian Sea</td>
<td>3.30</td>
</tr>
<tr>
<td>Cromer</td>
<td>England</td>
<td>German Ocean</td>
<td>7.0</td>
</tr>
<tr>
<td>Dartmouth</td>
<td>Ditto</td>
<td>English Channel</td>
<td>6.30</td>
</tr>
<tr>
<td>David's Head, St.</td>
<td>Wales</td>
<td>St. George's Channel</td>
<td>6.0</td>
</tr>
<tr>
<td>Dieppe</td>
<td>France</td>
<td>English Channel</td>
<td>10.30</td>
</tr>
<tr>
<td>Dort</td>
<td>Dutchland</td>
<td>German Ocean</td>
<td>3.15</td>
</tr>
<tr>
<td>Dover</td>
<td>England</td>
<td>English Channel</td>
<td>11.30</td>
</tr>
<tr>
<td>Downs</td>
<td>Ditto</td>
<td>German Ocean</td>
<td>1.15</td>
</tr>
<tr>
<td>Dublin</td>
<td>Ireland</td>
<td>Irish Sea</td>
<td>9.15</td>
</tr>
<tr>
<td>Dunbar</td>
<td>Scotland</td>
<td>German Ocean</td>
<td>2.30</td>
</tr>
<tr>
<td>Dundee</td>
<td>Ditto</td>
<td>Ditto</td>
<td>2.15</td>
</tr>
<tr>
<td>Dungarvan</td>
<td>Ireland</td>
<td>Atlantic Ocean</td>
<td>4.30</td>
</tr>
<tr>
<td>Dungenesfs</td>
<td>England</td>
<td>English Channel</td>
<td>9.45</td>
</tr>
<tr>
<td>Dunkirk</td>
<td>France</td>
<td>German Ocean</td>
<td>9.0</td>
</tr>
<tr>
<td>Dunnoe</td>
<td>Isle of Wight</td>
<td>English Channel</td>
<td>9.45</td>
</tr>
<tr>
<td>Edinburgh</td>
<td>Scotland</td>
<td>German Ocean</td>
<td>4.30</td>
</tr>
<tr>
<td>Edynfone</td>
<td>England</td>
<td>English Channel</td>
<td>5.30</td>
</tr>
<tr>
<td>Elbe, River (Mouth)</td>
<td>Germany</td>
<td>German Ocean</td>
<td>0.0</td>
</tr>
<tr>
<td>Embden</td>
<td>Ditto</td>
<td>Ditto</td>
<td>0.0</td>
</tr>
<tr>
<td>Enchnuyfen</td>
<td>Dutchland</td>
<td>Zuyder Sea</td>
<td>0.0</td>
</tr>
<tr>
<td>Etaples</td>
<td>France</td>
<td>English Channel</td>
<td>11.0</td>
</tr>
<tr>
<td>Falmouth</td>
<td>England</td>
<td>Ditto</td>
<td>5.30</td>
</tr>
<tr>
<td>Flamborough-Head</td>
<td>Ditto</td>
<td>German Ocean</td>
<td>4.0</td>
</tr>
<tr>
<td>Florida, Cape</td>
<td>Florida</td>
<td>Gulf of Mexico</td>
<td>7.30</td>
</tr>
<tr>
<td>Flushing</td>
<td>Dutchland</td>
<td>German Ocean</td>
<td>0.45</td>
</tr>
<tr>
<td>Fly, Isle of</td>
<td>Ditto</td>
<td>Ditto</td>
<td>7.30</td>
</tr>
<tr>
<td>Foreland, North</td>
<td>England</td>
<td>Ditto</td>
<td>9.45</td>
</tr>
<tr>
<td>Fordland, South</td>
<td>Ditto</td>
<td>English Channel</td>
<td>9.45</td>
</tr>
<tr>
<td>Foulnefs</td>
<td>Ditto</td>
<td>German Ocean</td>
<td>6.45</td>
</tr>
<tr>
<td>Foye</td>
<td>Ditto</td>
<td>English Channel</td>
<td>5.15</td>
</tr>
<tr>
<td>Garmone, River</td>
<td>France</td>
<td>Bay of Biscay</td>
<td>3.0</td>
</tr>
<tr>
<td>Gafpey Bay</td>
<td>Acadia</td>
<td>Gulf of St. Lawrence</td>
<td>1.30</td>
</tr>
<tr>
<td>Gibraltar</td>
<td>Spain</td>
<td>Mediterranean Sea</td>
<td>0.0</td>
</tr>
<tr>
<td>Good Hope, Cape of</td>
<td>Ditto</td>
<td>Indian Ocean</td>
<td>3.0</td>
</tr>
<tr>
<td>Granville</td>
<td>France</td>
<td>English Channel</td>
<td>7.0</td>
</tr>
<tr>
<td>Graveline</td>
<td>Ditto</td>
<td>Ditto</td>
<td>0.0</td>
</tr>
<tr>
<td>Gravefend</td>
<td>England</td>
<td>River Thames</td>
<td>1.30</td>
</tr>
<tr>
<td>Groine, or Cape Corunna</td>
<td>Spain</td>
<td>Bay of Biscay</td>
<td>3.0</td>
</tr>
<tr>
<td>Guernsey, Island of</td>
<td>England</td>
<td>English Channel</td>
<td>1.30</td>
</tr>
<tr>
<td>Haarlem</td>
<td>Dutchland</td>
<td>German Ocean</td>
<td>9.0</td>
</tr>
<tr>
<td>Halifax</td>
<td>Nova Scotia</td>
<td>Western Ocean</td>
<td>7.30</td>
</tr>
<tr>
<td>Hamburg</td>
<td>Germany</td>
<td>River Elbe</td>
<td>6.0</td>
</tr>
<tr>
<td>Hartlepool</td>
<td>England</td>
<td>Ditto</td>
<td>3.0</td>
</tr>
<tr>
<td>Harwich</td>
<td>Ditto</td>
<td>Ditto</td>
<td>11.15</td>
</tr>
<tr>
<td>Havre de Grace</td>
<td>France</td>
<td>English Channel</td>
<td>9.0</td>
</tr>
<tr>
<td>Henry, Cape</td>
<td>Virginia</td>
<td>Atlantic Ocean</td>
<td>11.15</td>
</tr>
<tr>
<td>Holyhead</td>
<td>Wales</td>
<td>Irish Sea</td>
<td>1.30</td>
</tr>
<tr>
<td>Honfleur</td>
<td>France</td>
<td>River Seine</td>
<td>9.0</td>
</tr>
<tr>
<td>Hull</td>
<td>England</td>
<td>River Humber</td>
<td>6.0</td>
</tr>
<tr>
<td>Humber, River (Entrance)</td>
<td>Ditto</td>
<td>German Ocean</td>
<td>5.13</td>
</tr>
<tr>
<td>Ice Cove</td>
<td>North Main</td>
<td>Hudson's Straits</td>
<td>10.0</td>
</tr>
<tr>
<td>John's, Fort St.</td>
<td>Newfoundland</td>
<td>Atlantic Ocean</td>
<td>6.0</td>
</tr>
<tr>
<td>John de Luz, St.</td>
<td>France</td>
<td>Bay of Biscay</td>
<td>3.30</td>
</tr>
<tr>
<td>Julian, Port St.</td>
<td>Patagonia</td>
<td>South Atlantic Ocean</td>
<td>4.45</td>
</tr>
<tr>
<td>Kentish Knock,</td>
<td>England</td>
<td>German Ocean</td>
<td>0.0</td>
</tr>
<tr>
<td>Kilduin, Isle of</td>
<td>Lapland</td>
<td>Northern Ocean</td>
<td>7.30</td>
</tr>
<tr>
<td>Kinfa</td>
<td>Ireland</td>
<td>Atlantic Ocean</td>
<td>5.15</td>
</tr>
<tr>
<td>Land's-End</td>
<td>England</td>
<td>St. George's Channel</td>
<td>7.30</td>
</tr>
<tr>
<td>Leith</td>
<td>Scotland</td>
<td>German Ocean</td>
<td>4.30</td>
</tr>
</tbody>
</table>

Vol. XXXV.
<table>
<thead>
<tr>
<th>Names of Places</th>
<th>Countries</th>
<th>Coast</th>
<th>High-Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lowes, Isle of, North Port</td>
<td>England</td>
<td>German Ocean</td>
<td>9.45</td>
</tr>
<tr>
<td>Lifford</td>
<td>Scotland</td>
<td>Western Ocean</td>
<td>6.30</td>
</tr>
<tr>
<td>Limer</td>
<td>England</td>
<td>English Channel</td>
<td>7.0</td>
</tr>
<tr>
<td>Lifford</td>
<td>Portugal</td>
<td>River Tagus</td>
<td>2.15</td>
</tr>
<tr>
<td>Liverpool</td>
<td>England</td>
<td>Irish Sea</td>
<td>11.15</td>
</tr>
<tr>
<td>Lizard</td>
<td>Ditto</td>
<td>English Channel</td>
<td>7.30</td>
</tr>
<tr>
<td>London</td>
<td>Ditto</td>
<td>River Thames</td>
<td>3.0</td>
</tr>
<tr>
<td>London, New</td>
<td>New England</td>
<td>Western Ocean</td>
<td>1.30</td>
</tr>
<tr>
<td>Long Island</td>
<td>Ditto</td>
<td>Ditto</td>
<td>3.0</td>
</tr>
<tr>
<td>Longsand-Head</td>
<td>England</td>
<td>German Ocean</td>
<td>10.30</td>
</tr>
<tr>
<td>Louis, Port</td>
<td>France</td>
<td>Bay of Biscay</td>
<td>3.0</td>
</tr>
<tr>
<td>Lundy, Isle of</td>
<td>England</td>
<td>St. George’s Channel</td>
<td>5.15</td>
</tr>
<tr>
<td>Lynn</td>
<td>Ditto</td>
<td>German Ocean</td>
<td>6.0</td>
</tr>
<tr>
<td>Madeira, Island of</td>
<td>Canaries</td>
<td>English Channel</td>
<td>6.0</td>
</tr>
<tr>
<td>Maes, River (Mouth)</td>
<td>Dutchland</td>
<td>Irish Sea</td>
<td>9.0</td>
</tr>
<tr>
<td>Malpas, St.</td>
<td>England</td>
<td>English Channel</td>
<td>11.15</td>
</tr>
<tr>
<td>Man, Isle of (well end)</td>
<td>Wales</td>
<td>St. George’s Channel</td>
<td>5.15</td>
</tr>
<tr>
<td>Margate</td>
<td>Ditto</td>
<td>English Channel</td>
<td>4.30</td>
</tr>
<tr>
<td>Milford</td>
<td>England</td>
<td>Bay of Biscay</td>
<td>3.0</td>
</tr>
<tr>
<td>Mount’s Bay</td>
<td>Norway</td>
<td>Western Ocean</td>
<td>11.15</td>
</tr>
<tr>
<td>Nantes</td>
<td>England</td>
<td>English Channel</td>
<td>10.15</td>
</tr>
<tr>
<td>Naze</td>
<td>Ditto</td>
<td>German Ocean</td>
<td>3.15</td>
</tr>
<tr>
<td>Needle's</td>
<td>Flanders</td>
<td>Ditto</td>
<td>12.0</td>
</tr>
<tr>
<td>Newcastle</td>
<td>England</td>
<td>Ditto</td>
<td>11.15</td>
</tr>
<tr>
<td>Nieuport</td>
<td>Lapland</td>
<td>Ditto</td>
<td>8.15</td>
</tr>
<tr>
<td>Nore</td>
<td>England</td>
<td>Ditto</td>
<td>11.15</td>
</tr>
<tr>
<td>North Cape</td>
<td>England</td>
<td>Ditto</td>
<td>11.15</td>
</tr>
<tr>
<td>Orfordsnfs</td>
<td>Scotland</td>
<td>Ditto</td>
<td>11.15</td>
</tr>
<tr>
<td>Orkney Isles, (limits)</td>
<td>Newfoundland</td>
<td>Ditto</td>
<td>11.15</td>
</tr>
<tr>
<td>Offord</td>
<td>Flanders</td>
<td>Ditto</td>
<td>11.15</td>
</tr>
<tr>
<td>Placeenta</td>
<td>England</td>
<td>Ditto</td>
<td>11.15</td>
</tr>
<tr>
<td>Plymouth</td>
<td>Ditto</td>
<td>Ditto</td>
<td>11.15</td>
</tr>
<tr>
<td>Portland</td>
<td>Ditto</td>
<td>Ditto</td>
<td>11.15</td>
</tr>
<tr>
<td>Portmouth</td>
<td>Canada</td>
<td>Ditto</td>
<td>11.15</td>
</tr>
<tr>
<td>Quebec</td>
<td>France</td>
<td>Ditto</td>
<td>11.15</td>
</tr>
<tr>
<td>Rhee, Isle of</td>
<td>Ditto</td>
<td>Ditto</td>
<td>11.15</td>
</tr>
<tr>
<td>Rochefort</td>
<td>Ditto</td>
<td>Ditto</td>
<td>11.15</td>
</tr>
<tr>
<td>Rochelle</td>
<td>England</td>
<td>Ditto</td>
<td>11.15</td>
</tr>
<tr>
<td>Rochefer</td>
<td>Ditto</td>
<td>Ditto</td>
<td>11.15</td>
</tr>
<tr>
<td>Rotterdam</td>
<td>Dutchland</td>
<td>Ditto</td>
<td>11.15</td>
</tr>
<tr>
<td>Rouen</td>
<td>France</td>
<td>Ditto</td>
<td>11.15</td>
</tr>
<tr>
<td>Rye</td>
<td>England</td>
<td>Ditto</td>
<td>11.15</td>
</tr>
<tr>
<td>Sandwich</td>
<td>Ditto</td>
<td>Ditto</td>
<td>11.15</td>
</tr>
<tr>
<td>Scarborough-Head</td>
<td>Ditto</td>
<td>Ditto</td>
<td>11.15</td>
</tr>
<tr>
<td>Scilly Isles</td>
<td>Ditto</td>
<td>Ditto</td>
<td>11.15</td>
</tr>
<tr>
<td>Seine, River</td>
<td>England</td>
<td>Ditto</td>
<td>11.15</td>
</tr>
<tr>
<td>Senegal, River</td>
<td>France</td>
<td>Ditto</td>
<td>11.15</td>
</tr>
<tr>
<td>Severn, River</td>
<td>Negroland</td>
<td>Ditto</td>
<td>11.15</td>
</tr>
<tr>
<td>Sheeriffs</td>
<td>England</td>
<td>Ditto</td>
<td>11.15</td>
</tr>
<tr>
<td>Shetland Island (limits)</td>
<td>Scotland</td>
<td>Ditto</td>
<td>11.15</td>
</tr>
<tr>
<td>Shoreham</td>
<td>England</td>
<td>Ditto</td>
<td>11.15</td>
</tr>
<tr>
<td>Sierra Leone</td>
<td>Guinea</td>
<td>Ditto</td>
<td>11.15</td>
</tr>
<tr>
<td>Sky, Isle of</td>
<td>English</td>
<td>Ditto</td>
<td>11.15</td>
</tr>
<tr>
<td>Southampton</td>
<td>Ditto</td>
<td>Ditto</td>
<td>11.15</td>
</tr>
<tr>
<td>Spurn</td>
<td>Ditto</td>
<td>Ditto</td>
<td>11.15</td>
</tr>
<tr>
<td>Start-Point</td>
<td>Ditto</td>
<td>Ditto</td>
<td>11.15</td>
</tr>
<tr>
<td>Stockton</td>
<td>Ditto</td>
<td>Ditto</td>
<td>11.15</td>
</tr>
<tr>
<td>Strongford Bay</td>
<td>Ireland</td>
<td>Ditto</td>
<td>11.15</td>
</tr>
<tr>
<td>Sunderland</td>
<td>England</td>
<td>Ditto</td>
<td>11.15</td>
</tr>
<tr>
<td>Swin</td>
<td>Socotora</td>
<td>Ditto</td>
<td>11.15</td>
</tr>
<tr>
<td>Tamarin-Town</td>
<td>England</td>
<td>Ditto</td>
<td>11.15</td>
</tr>
<tr>
<td>Tees, River (Mouth)</td>
<td>England</td>
<td>Ditto</td>
<td>11.15</td>
</tr>
<tr>
<td>Names of Places</td>
<td>Countries</td>
<td>Coast</td>
<td>High-Water</td>
</tr>
<tr>
<td>--------------------------</td>
<td>-------------------</td>
<td>-------------</td>
<td>------------</td>
</tr>
<tr>
<td>Teneriffe, Island of</td>
<td>Canaries</td>
<td>Atlantic Ocean</td>
<td>11 4</td>
</tr>
<tr>
<td>Texel, Island of</td>
<td>Dutchland</td>
<td>German Ocean</td>
<td>7 30</td>
</tr>
<tr>
<td>Thames, River (Mouth)</td>
<td>England</td>
<td>Ditto</td>
<td>1 30</td>
</tr>
<tr>
<td>Timmouth</td>
<td>Ditto</td>
<td>Ditto</td>
<td>3 0</td>
</tr>
<tr>
<td>Topham</td>
<td>Ditto</td>
<td>English Channel</td>
<td>6 0</td>
</tr>
<tr>
<td>Torbay</td>
<td>Ditto</td>
<td>Ditto</td>
<td>5 15</td>
</tr>
<tr>
<td>Tory, Island of</td>
<td>Ireland</td>
<td>Western Ocean</td>
<td>5 30</td>
</tr>
<tr>
<td>Valery, St.</td>
<td>France</td>
<td>English Channel</td>
<td>10 30</td>
</tr>
<tr>
<td>Vannes</td>
<td>Ditto</td>
<td>Bay of Biscay</td>
<td>3 45</td>
</tr>
<tr>
<td>Ushant, Isle of</td>
<td>Ireland</td>
<td>English Channel</td>
<td>4 30</td>
</tr>
<tr>
<td>Waterford</td>
<td>Ditto</td>
<td>St. George's Channel</td>
<td>6 30</td>
</tr>
<tr>
<td>Weymouth</td>
<td>England</td>
<td>German Ocean</td>
<td>3 0</td>
</tr>
<tr>
<td>Whithby</td>
<td>Ditto</td>
<td>English Channel</td>
<td>0 0</td>
</tr>
<tr>
<td>Wight, Isle of, North, South, East, and West End</td>
<td>Ditto</td>
<td>Ditto</td>
<td>0 0</td>
</tr>
<tr>
<td>Wincilenea</td>
<td>Ditto</td>
<td>Ditto</td>
<td>0 45</td>
</tr>
<tr>
<td>Wintertonnes</td>
<td>Ditto</td>
<td>Ditto</td>
<td>9 0</td>
</tr>
<tr>
<td>Yarmouth</td>
<td>Ditto</td>
<td>Ditto</td>
<td>9 45</td>
</tr>
<tr>
<td>York Fort</td>
<td>New Wales</td>
<td>Hudson's Bay</td>
<td>9 10</td>
</tr>
<tr>
<td>York, New</td>
<td>United States</td>
<td>Atlantic Ocean</td>
<td>3 0</td>
</tr>
<tr>
<td>Younghall</td>
<td>Ireland</td>
<td>St. George's Channel</td>
<td>4 30</td>
</tr>
</tbody>
</table>

The following times serve for coasts of considerable extent, and nearly for the places on those coasts; viz. Finmark, or N.N.W. coast of Lapland, 1° 30'; Jutland iles, Øσ Øm; Friesland coast, 7° 30'; Zealand coast, 1° 30'; Flanders coast, øσ øm; Picardy and Normandy coasts, 1° 30'; Biscay, Gallician, and Portugal coasts, 2° 30'; Irish coast, 3° 30'; Irish south coast, 5° 15'; Africa west coast, 3° 30'; America east coast, 4° 30'.

The use of the preceding table is to find the time of high-water at any of the places contained in it: for this purpose, find the time of the moon's fourting on a given day (see Moon); and then add the time which the moon has passed the meridian on the full and change days, to make high-water at that place; and the sum gives the time of high-water on the given day.


Tide-Dial, the name of an instrument contrived by Mr. Ferguson, for exhibiting and determining the state of the tides. It is represented in Plate IV. Dialling, fig. 36., and the external parts of it consist of 1. An eight-sided box, on the top of which, at the corners, are shown the phases of the moon at the octants, quarters, and full. Within these is a circle of 20° equal parts, which are the days of the moon's age reckoned from the full to new moon, round to the full again. Within this circle is one of twenty-four hours, divided into their halves and quarters. 2. A moving elliptical plate, painted blue, to shew the rising of the tides under and opposite to the moon, with the words high-water, tide-falling, low-water, tide-rising, marked upon it. To one end of this plate is fixed the moon's position by the wire W, which goes along with it. 3. Above this elliptical plate is a round one, with the points of the compass upon it, and also the names of above two hundred places in the large machine (but only thirty-two in the figure, to avoid confusion) set over those points on which the moon bears when she raises the tides to the greatest heights at these places, twice in every lunar day; and to the north and south points of this plate are fixed two indices I and K, which shew the times of high-water, in the hour-circle, at all these places. 4. Below the elliptical plate are four small plates, two of which project from below at the ends at new and full moon; and by lengthening the ellipse, the four plates are adjustable, to shew the spring-tides: the other two of these small plates appear at low-water when the moon is in her quadratures, or at the sides of the elliptic plate, to shew the neap-tides. When any one of these small plates appear, the other two are hid; and when the moon is in her octants, they all disappear. Within the box are a few wheels for performing these motions by the handle H. Turn the handle till the moon, M, comes to any given day of her age in the circle of 20° equal parts, and the moon's wire W will intercept the time of her coming to the meridian on that day, in the hour-circle: the XII under the fun being mid-day, and the opposite XII mid-night: then looking for the name of any given place on the round plate (which makes 29° rotations, whilst the moon M makes only one revolution from the fun to the fun again) turn the handle till that place comes to the word high-water under the moon, and the index which falls among the forenoon hours will shew the time of high-water at that place in the forenoon of the given day; then turn the plate half round, till the same place comes to the opposite high-water mark, and the index will shew the time of high-water in the afternoon at that place. And thus, as all the different places come successively under and opposite to the moon, the indices shew the times of high-water at them in both parts of the day; and when the same places come to the low-water marks, the indices shew the times of low-water. For about three days before and after the times of new and full moon, the two small plates come out a little way from below the high-water marks on the elliptical plate, to shew that the tides rise still higher about these times: about the quarters, the other two plates come out a little from under the low-water
TID

tide-mark toward the fun, and on the oppofite fide, flour-
ishing that the tides of flood rise not fo high, nor do the
tides of ebb fall fo low, as at other times. For the defcrip-
tion of the inferior work of this machine, and the method of
conflruing it, fee Ferguson's Altron. p. 297.

TIDE-Gate. See Gate.

TIDE-Gates are the lower gates of a lock open to a tide-
way: there are also placed at the mouths of drains.

TIDE-Mill, in Rural Economy and Agriculture, an ufeful
form of mill, the moving power of which is formed by
running a dam across an inlet where tide-water comes in, so
as to leave a narrow passage open for placing it in on one
fide. It also furnifhes a mill for raffing and clearing lands
from tide-water in fen fituations, and where injury is
done by the overflcwing of the tides. See WATERING
of Land.

Tide-mills may mofi be formed without producing any
obftuction or hindrance to agriculture.

TIDE-Waiters, or Tide-Men, certain officers belonging
to the cullom-house, appointed to watch or attend on
fhips coming from abroad, to fee that nothing be landed till
the culloms be paid.

They are thus called, because they go aboard the ships at
their arrival in the mouth of the Thames, and come up with
the tide.

TIDENSDF, in Geography, a town of Pruffia, in
the province of Ermeland; 4 miles S. of Frauenburg.

TIDER, or Ner, a small ifland in the Atlantic, near the
coafl of Africa. N. lat. 10° 30'.

TIDESWELL, a small market-town in the hundred of
High Peak, and county of Derby, England; is fited in
a valley among bleak hills, 32 miles N.N.W. from the
county-town, and 160 miles N.W. by N. from London.
The town is reported to have received its name from an
ebbing and flowing well, now hardly remembered, as it has
long ceased to flow. The church, which was erected in
the fourteenth century, is a handfome edifice of the con-
ventual form, with a neat tower at the west end, terminated
by eight pinnacles; thofe at the angles rising from octa-
gonal bases, and being much higher than the intermediate
ones. In the chancel is a small flone commemorative of
John Fofjambe, who died in 1358, and is said to have con-
tributed much towards the building of the church. A
raifed tomb perpetuates the name of Sampfon Mevrill, who
died in 1462, and who, in the course of two years, was en-
geaged in eleven battles in France. Among other monu-
ments of ancient date, is one to the memory of a native of
this town, Robert Purfoglove, prior of Gifburn priory, who
obtained a penfion from Henry VIII. for his obfequious
compliance with that monarch's wishes, in not only fur-
rendering his own house, but alfo acting as a commif-
sioner to procure the surrender of others. In queen Mary's
reign he was appointed archdeacon of Nottingham, and
fulfragant bishop of Hull; but on the acceffion of Eliza-
beth, he was deprived of all his spiritualities, and retired to
Tidewell, where, having founded a grammar-school, and an
hospita1 for twelve poor people, he died in 1579. By the
population return of the year 1811, the inhabitants of this
parifh are flated to be 1219, who are chiefly supported by
the mining buinfefs; the number of houfes, which are mofi
fattered on the oppofite banks of a rivulet, was eimated at
283. A weekly market is held on Wednefdays; and
here are three annual fairs.

In the vicinity of Tidewell is the fequeftered retreat of
Monfal Dale, peculiarly eminent for picturesque beauty.
Near the head of the Dale, the rocks jut out on the south
side, like the immense towers of a strong fortrefs. Lower
down, the crags ftench into verdure, the dale expands, and
the eye dwells enraptured on the rich profpect that preffents
itfelf. The back-ground is formed by a steep precipice,
variegated by short herbage and briifwood, with occa-
flonally a ftrating rock breaking its continuity of furface.

On the hill-tum of an eminence called the Great Fin, was
about a large barrow, about 160 feet in circumference, chiefly com-
pofed of broken mafs of limeftone, to obtain which the
barrow was destroyed about the year 1795. Within this
firmus various fkeletons were discovered, two of them of
gigantic fize, with feveral urns, and other ancient memo-
rials; among which were two arrow-heads of flint, whence
the barrow is fuppofed to have been of very remote anti-
quity; for, as the learned author of "Nenia Britannica"
obferves, "flint arrow-heads are evidences of a people not
in the ufe of malleable metal; and it therefore implies,
wherever thofe arms are found in barrows, they are inco-
tellibly the relics of a primitive barbarous people, and pre-
ceding the era of thofe barrows in which bras or iron arms
are found." It is worthy of note, that, excepting on the
rode next the precipice, the fummit of the Great Fin is
furronded by a double ditch, with a vallum to each: the
diftance between the banks is 160 yards.

Near the hamlet of Wormhill, in this parish, is a romantic
and deep glen or dale, where the river Wye flows beneath
a tremendous mafs of rock, called Chee-Tor. This mafs of
freadfone rifes about 300 feet above the level of the river,
and confiftutes a moft imposing and fingular feature. At a
small hamlet called Tunstall, in the liberty of Wormhill,
was born James Brindley, juftly famed for his fuccefsful
efforts in planning and executing canals. See BRINDLEY.

— Beauties of England and Wales, vol. iii. Derbyshire; by
J. Britton and E. W. Braley. Davies's Hiftorical and
Decriptive Account of Derbyshire, 8vo. 1811.

TIDEWA, a town of Sweden, in Weft Gothland; 62
miles N.E. of Uddevalla.

TIDLA, a river of Sweden, which runs into the
Wenner lake, near Marietadt, in the province of Weft
Gothland.

TIDON, a town on the east coaft of the ifland of Celebes,
in the bay of Gunong Teltu. N. lat. 6° 2'. E. long.
120° 38'.

TIDOR, or Tidore, an ifland in the East Indian
sea, and one of thofe called Moluccas, fettuated near the
weft coaft of the ifland of Gilolo, between Ternate and
Timor; about ten leagues in circumference, and fof called
from its capital, though named Tadura, or Daco, by the
natives. It abounds in fpecies, efcpecially floves. The
Dutch have feveral forts, but the ifland is governed by a
king, who poiffefs likewife fome territory on the ifland of
Gilolo; 15 miles S.E. of Ternate. N. lat. 0° 42'.
E. long. 127° 19'.

TIDS, a river of Morocco, which difcharges itsfelf into
the ocean a few miles S. of the Tegrewelt, or Cape
Oifam.

TIEBAS, a town of Spain, in the province of Navarre;
5 miles S.E. of Pamplona.

TIEDEMAN, DIETERICH, in Biography, a philo-
 sophical writer, was born April 1748, at Bremenverde,
in the duchy of Bremen, and educated in the school of his
native place in the Greek and Latin languages, in which he
made very confiderable proficiency. Devoting himfelf to
the church, he removed to the school of Verden, and from
thence to the Athenem at Bremen, where he formed an
intimate friendship with Meiners, afterwards professor at
Göttingen.
GOTTINGEN. In 1767 he settled at Gottingen, and here he renounced the study of theology, because he disapproved the system there taught, and applied to mathematics, classical literature, and philosophy. In the winter of 1769 he fixed his residence in Livonia, as tutor to a nobleman of that country; and whilst he was there, he published at Riga, in 1772, his "Essay on the Origin of Language." After visiting his native place in the following year, he went to Gottingen, and formed an acquaintance with the celebrated Heyne, who wrote a preface to his "System of Stoic Philosophy," and persuaded him to publish it. By the recommendation of this learned friend, he was appointed professor of ancient literature in the Caroline college at Caffel, of which office he took possession in 1766. His intervals of leisure were employed in the study of philosophy and its history; and also in preparing for the press his "Investigation of Man," "The First Philosophers of Greece, & c.," and his "Spirit of Speculative Philosophy." Upon the dissolution of the Caroline college in 1786, he occupied the chair of philosophy at Marburg, and his lectures were very popular. He was an opponent of Kant's philosophy: and he indulged himself in ridiculing the extravagant pretensions and pious arrogance of the founders of sects. Although his constitution was robust, he was carried off by a fever and inflammation of the lungs, in May 1803, at the age of 55. As a literary character, he was intimately conversant with the literature of Greece and Rome, and with all the syslms of ancient and modern philosophy, as well as the manners and customs of ancient and modern times. His extensive erudition appears in his "Argumenta Platonis," annexed to the edition of Plato, printed at Deux-Ponts; in his prize essay, entitled "Dissertatio de Quaflione quae fuerit magicaus artium origo," and in various other dissertations. In philosophy he was in early life a dogmatist, and in the latter period of his life inclined to scepticism. His works, which, besides those already mentioned, were numerous, and relate chiefly to the history of philosophy, and its different systems, afford ample evidence of his affability and labour. Monthly Magazine. Gen. Biog.

TIEFENSEE, in Geography, a town of Prussia, on a lake of the same name; 20 miles S. of Brandenburg.

TIEFF, a town of Prussia, in the province of Bartenland; 7 miles S.E. of Angerburg.

TIEFFENAW, a town of Prussian Pomerelia; 15 miles S. of Marienburg.

TIELLEN-HEAD, a cape of the county of Donegal, on the west coast of Ireland. N. lat. 54° 41'. W. long. 8° 49'.

TIEM, a town of Aasia, in the kingdom of Laos, on the Mecom; 90 miles S.S.E. of Lastian.

TIEN, or LIEN, a city of China, of the second rank, in Quang-tong; 960 miles S. of Peking. N. lat. 24° 52'. E. long. 118° 49'.—Alfo, a town of Corea; 23 miles N.N.E. of King-ki-tao.—Alfo, a city of China, of the second rank, in Quang-hi, on the north side of the Pofoi; 1120 miles S.S.W. of Peking. N. lat. 23° 46'. E. long. 106° 19'.

TIEN-CHAN, a town of Corea; 53 miles W.N.W. of Han-tcheou.

TIENEN. See TIRLEMONT.

TIENGEN, or THIENEN, or THUNGEN, a town of Germany, in the principality of Klettgen, on the Wutach, formerly, with its district, constituting a lordship; 29 miles E. of Balo. N. lat. 47° 42'. E. long. 8° 17'.

TIENHOVEN, a town of Holland, on the Leek; 6 miles S. of Schoonhoven.—Alfo, a town of Utrecht; 7 miles N. of Utrecht.

TIEN-SING, a great port of China, on the river Pei-ho. Its Chinese name literally signifies "heavenly spot," and in the time of Marco Polo, when it is supposed to have been much larger than at present, it was called "Citla Celeste:" and it is said to have a claim on this appellation from its situation in a genial climate, fertile soil, dry air, and serene sky. It is the general emporium for the northern provinces of China, and is built at the confluence of two rivers, from which it rises in a gentle slope. The palace of the governer stands on a projecting point, commanding a broad bay, and expanse of water, produced by the union of the rivers, and almost covered with vessels of different sizes. These two rivers are the Pei-ho and the Yung-ling-ho, or grain-bearing river, from the quantities of wheat conveyed upon it from the province of Shan-fei, and sent up by the Pei-ho to the neighbourhood of Peking. Over these rivers, where they unite, is a bridge of boats: and along the quays were some temples and other handiome edifices, but the rest consisted chiefly of shops for the retail of goods, and also warehouses, together with yards, and magazines for maritime stores. The houses at Tien-fing are chiefly built of brick, of a leaden-blue colour. Few are red: the poorest are pale brown. Many of the houses are two stories high.

TIEN-TCHA, or NEW GIBRALTAR, a mountain of Cochin-china, which forms the harbour of Tenon; which see.

TIENTONG, a town of Siam; 350 miles N.N.W. of Jutia.

TIEN-TSANG, a town of Thibet; 268 miles E.S.E. of Hami.

TIEPOLO, GIOVANNI BATISTA, in Biography, was one of the laft of the eminent Venetian painters. He was born at Venice in 1697, and was a scholar of G. Lazza-riani; but he afterwards studied the works of P. Veronese. He possessed a quick invention, and great freedom of hand, and was admirably qualified for the execution of large fresco works upon ceilings, &c.; where great facility of handling, and richness of colouring, will often apologize for the want of higher qualities, particularly in allegoric or grotesque subjects. Tiepolo was employed in many of the palaces in Italy, but most honoured by the employment he received from the king of Spain, who engaged him to adorn his palace at Madrid. He died at Madrid in 1770, at the age of 73. He etched many of his own designs with great neatness and taste.

TIER, in Sea Language, the name of the several ranges of guns mounted on one side of a ship's deck; which, according as they are placed on the lower, middle, or upper decks, are called the lower, middle, or upper tier.

TIER of the Cable, denotes a range of the fakes or windings of the cable, which are laid within one another in an horizontal position, so that the last becomes the innermost.

TIER Cable, is the hollow space in the middle of a cable, when it is coiled.

TIER, in Organ-Building, is used to distinguish the different ranks or ranges of pipes (as a tier of guns in men of war) in the front of the instrument, and even the interior of the house, when the compound flutes have several ranks of pipes, as the fesquialter, turriton, and cornet.

TIERBY, in Geography, a town of Sweden, in the province of Halland; 6 miles S.E. of Helmsland.

TIERCE, a town of France, in the department of the Mayne and Loire; 3 miles S. of Chateauneuf.

TIERCE, or TIERE, in Commerce, a measure of liquid things,
things, as wine, oil, &c. containing the third part of a pipe, or forty-two gallons. See Measure.

The tierce is also a weight by which provisions are sold in Ireland. The tierces, barrels, and firkins are not tared, but the pieces in each cask must be of the following weight and number:

<table>
<thead>
<tr>
<th>Lbs.</th>
<th>per tierce</th>
<th>8 each.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Navy</td>
<td>3 04</td>
<td>38</td>
</tr>
<tr>
<td>Ind.</td>
<td>3 36</td>
<td>42</td>
</tr>
<tr>
<td>Mfs</td>
<td>3 24</td>
<td>38</td>
</tr>
<tr>
<td>Ditto</td>
<td>2 00</td>
<td>25</td>
</tr>
<tr>
<td>Ditto</td>
<td>1 00</td>
<td>25</td>
</tr>
</tbody>
</table>

Tierce, in Music, a 3d. The highest stop in an organ, called the tierce, is a major 3d above the 15th, every found being a 17th above the diapason. See Third.

Tierce de Picardie, in French Music, and indeed all choral music of old masters in a minor key, is terminated with a sharp 3d, which the French now call tierce de Picardie, on account of the great number of cathedrals in that province, where it continues still in use.

Padre Martini (Saggio di Contrap. parte prima, 23.) recommends the terminating minor movements with a sharp 3d; a practice which Rouffeau (Dict. de Mus.) confines as Gothic, and a proof of bad taste. If the first of those excellent writers wish'd only to preserve its use in the church, and the second to banish it elsewhere, they were both right, however their opinions may seem to clash. The learned author of the Saggio di Contrappunto, who was so perfectly acquainted with all the beauties and effects of choral music, is certainly more to be relied on in whatever concerns it, than the animated author of the Dictionnaire de Musique; who, with the most refined taste and exalted views with respect to dramatic compositions, had neither time nor opportunity sufficiently to explore the mysteries of canto fermo, or to become a very profound contrapuntist. For our own part, though we never wish to hear a song or glee in a minor key, and with a sharp 3d; yet there is something so solemn and grateful in these terminations of ecclesiastical compositions, that we should be very sorry if the practice were not continued. And if we consider the relation and composition of the several stops in an organ, we shall find, that as every single key in the chorus of that instrument has a complete chord with a sharp 3d to it, when we dwell on a chord with a flat 3d, while the tierce, cornet, fesquialter, and sometimes the furniture, are founding the sharp 3d, it affords an additional reason for the origin and continuance of the practice, besides the peculiar properties of tonal modulation.

Tierce, in Gaming, a sequence of three cards of the same colour.

Tierce, in Fencing. See Guard and Thrust.

Tierce Order. See Third Order.

Tierce Point. See Third Point.

Tiercel, Tierce, in Heraldry, denotes the shield to be divided by any of the partition lines, party, coupy, tranchy, or tailly, into three equal parts, of different colours or metals.

If the chief and base be of the same colour when divided by a fesse, they blazon it by expressing the colour, and mentioning the fesse; otherwise, they say, it is tierce in fesse, and mention each of the colours, or tierce in pale, if so divided in pale.

Tiercel, in Falconry, a name given to a male hawk, as being a third part lesser in size than the female.

Tiercellet. See Tassel.

Tierdill, in Geography, a town of Hindostan, in Viftapur; 20 miles W. of Galgala.

Tierpied, a town of France, in the department of the Channel; 3 miles E. of Avaranches.

Tierra. See Terra.

Tierra Bamba, a small island near the coast of South America, at the entrance of the harbour of Carthagena; where, in 1741, the English erected a battery.

Tiery, a town of Sweden, in the province of Upland; 80 miles N. of Upsal.

Ties, aboard a ship, are those ropes by which the yards hang; and when the halyards are strained to hoist the yards, these ties carry them up.

Tiessarbach, in Geography, a river of Wurttemberg, which runs into the Neckar, near Nurningen.

Tiétar, a river of Spain, which runs into the Tagus, near Talavan, in Effremadura.

Tiètcheou, a town of Chines Tartary, in the country of Kokonor: 688 miles S.E. of Hami. N. lat. 33° 60'. E. long. 102° 54'.

Tiéte, or Anhembi, a river of Brazil, which runs into the Parana.

Tifacoum, a word used by some of the chemical writers to express quicksilver.

Tifata Mons, in Ancient Geography, a mountain of Italy, in Campania, near Capua. The table of Peutinger has placed here two temples, one designated by the words "Ad Dianam," the other by those of "Jovis Titifanos." Tifata, a town of Italy, in Latium. Pliny.

Tifatum, a word used by some of the chemical writers to express sulphur.

Tifer, in Geography, a town of the duchy of Stria; 3 miles S. of Cilley.

Tifernum, or Tifernus, in Ancient Geography, a river of Italy, in Samnium.

Tifernum Metaurus, a town of Italy, in Samnium.

Tifernum Tiberinum, or Tifernum of the Tiber, Città di Castello, a town of Italy, in Umbria, to the N.W. towards the banks of the river Tiber. It was municipal.

Tifeselt, in Geography, a town of Foz; 12 miles N.E. of Salle.

Tifagueau, a town of France, in the department of the Vendée; 9 miles E. of Montaigu.

Tifé de Mer, in Natural History, a name given by count Mariâgli to a species of sea-plant, as he supposes it to be, commonly but erroneously reckoned among the sponges, and called by authors a branched sponge. This author has called it by this name from its resemblance to the heads of the Tyspa palustris, or cat's tail, when ripe in the month of September.

The sponges must be of a lax and cavernous texture; but this sub stance is soft and firm, and has no inequalities on its surface, excepting a few short hairs, which give it a velvety look, when first taken out of the water. It is a very elegant and beautiful substance; it grows to two feet in height, and is very elegantly branched; it grows on rocks and stones, and, when first taken out of the sea, is fall of a viscid water, as yellow as the yolk of an egg; but when this water is pressed out, and the substance dries, it loses its yellow, and becomes of a dusky-brown colour; it is very tough and firm while in the water, but when dry it usually
ufually breaks of itself into little pieces, and may be crum-
bled to powder between the fingers. This is a very strong
proof, among others, of its not being of the nature of the
fungus.

When viewed by the microscope, the whole surface is
found to be covered with extremely fine and slender hairs;
and, among these, there is an infinity of little apertures,
through which the sea-water makes its way.

When a branch of it is cut transversely, there are seen a
number of long and fine canals, by means of which the water,
received at these superficial apertures, is conveyed to its
whole substance. Marig. Hist. de la Mer, p. 82.

Substances of this kind are now known to be of animal
and not of vegetable origin. See CORAL.

TIPPENETH, in Geography, a town of Prussia, in the
province of Natangis; 10 miles S. of Brandenburg.

TIFESCH, or TIFAS, anciently Thesfes, a town of
Alegis; 40 miles S. of Bona. N. lat. 36° 20'. E. long.
7° 49'.

TIFLISBERG, a mountain of Switzerland, between
the cantons of Uri and Unterwalden.

TIGA, in Ancient Geography, a town of Africa, in Mau-
ritania Caesariana, near the coast of the Atlantic. Strabo.

TIGA, in Geography, a small island in the East Indian
sea, near the north-west coast of the island of Borneo.
N. lat. 6° 25'. E. long. 112° 14'.

TIGAON, an island in the Indian sea, near the north-
west coast of the island of Borneo. N. lat. 6° 10'. E.
long. 128° 48'.

TIGARA, in Ancient Geography, a town of Africa, in
the interior of Mauritania Caesariana. Ptol.

TIGAREA, in Botany, a barbarous or arbitrary name,
of which its publisher Aublet has given no explanation.—

Schreber admitted the genus, under the name of Rhinum,
in his Gen. 701, but in his Addenda to that work, 833, re-
duced it to Tetacera; see that article. Mr. Pursh, how-
ever, has restored the genus and the name, in his Flora
America Septentrionalis, 333, where he has, not without some
doubt, referred it to a very curious new shrub, found in the
meadows of the Rocky-mountains, and on the Columbia
river, by the name of T. tridentata, t. 15. This has crowded,
 wedge-shaped, hoary, three-toothed leaves, and solitary, ter-
 minal, yellow flowers, the size of hawthorn-blossoms. That
it is very distinct in genus from Aublet's Tigarea we have no
doubt, being very nearly akin to the Rubus japonicus of
Linnaeus, Corchorus japonicus of Thunberg, as has lately
been pointed out by M. De Candolle, in a paper read be-
fore the Linnean Society. However, it seems to us that the genus
of neither of these shrubs can as yet be determined, for want
of perfect fruit.

TIGAUDA, in Ancient Geography, a municipal town of
Africa, in Mauritania Caesariana, upon the route from Rufucurrum to Cala, between Cettlemum Tingitanum and

TIGE, in Architecture, a French term for the shaft or
full of a column, comprehended between the astragal and
the capital.

TIGEGUACU, in Ornithology, the name of a small Bra-
silian bird, of the size of a sparrow, and with a ridged and
triangular bill, in which it resembles the mouche-rolle; its
eyes are of a fine blue, and its legs and feet yellow; it is all
over of a deep black, but that it has a large blood-red spot
on the top of its head; its tail is short and black.

TIGELLIUS, in Biography, a musician, born in Sar-
dinia, grandson of Phaneus, a musician in great favour at
Rome in the time of Julius Caesar. Horace has alluded him
down to posterity as a merciless spendthrift, and an egregious
coccomb.

"Ambibjarum collegia Pharmacopoeæ
Mendici, Mimos, Balatrones, hoc genus omne
Mætum, ac felicitum illi cantoris morte Tigellii
Quippe benignus erat."—Sat. lib. i. 2.

Tigellius was not only much in favour with Julius Caesar,
but afterwards with Cleopatra and Augustus: he was an
able musician, an ingenious buffoon, and subtle courtier.

What Horace has said of his caprice, has often been applied,
and we fear will ever continue to be applied, to musicians of
a similar disposition.

"Omnibus hoc vitium ut cantoribus, inter amicos
Ut nunquam isudcant animum cantare rogati;
Injuxi nunquam defident."—Sat. lib. i. 3.

TIGENHAGEN, in Geography, a town of Prussian
Pomerelia; 12 miles N. of Marienburg.

TIGENWIT, a town of Africa, in Negroland; 45
miles N. of Arguin.

TIGER, a small island in the Spanish Main, near the
coast of Darien. N. lat. 8° 35'. W. long. 77° 30'.

Tiger, Tigres, in the Linnean system of Zoology, is a
species of cat, or Felis Tigres; which see.

The tiger (formed of 713, jagutis, a dart, whence 7137)
has its name from its fupposed swiftness. See the article
Felis Tigris.

Tiger, American. See Felis Onca.

Tiger-Cat. See Felis Canepinis.

Tiger, Hunting, or Leopard. See Felis Leopardus.

Tiger, Man. See MANTICAR.

Tiger-Shell, a name given to the red voluta, with large
white spots.

In the Linnean system, the tiger-shell is a species of the
cypraea. See SHELLS.

TIGGREE, in Geography, a town of Hindooblan,
in the circum of Sumbul; 17 miles S. of Nidjibabad.

TIGH, in our Old Writers, a clove or inclofure men-
tioned in ancient charters, and is still used in Kent in the
same fenfe.

TIGHMAN'S ISLAND, in Geography, a small island
in the Chelfapeak. N. lat. 38° 48'. E. long. 76° 21'.

TIGHT, in Sea Language, expresses the quality by
which a vessel refits the penetration of any fluid, whether
compri{ing its surface, or contained within it. Hence a
ship is said to be tight, when her planks are so compact
and solid, as to prevent the entrance of the water in which it
is immersed; and a cafe is called tight, when the flaves are so
close, that none of the liquid contained in it can effc throug
or between them. In both fenes, tight is opposed to leaky.

Falconer.

TIGILLUM, a word used by fome chemifirs to express
the tile with which they cover the mouth of their crucibles;
and, by others, for the crucible itself.

TIGILSKOI, in Geography, a town of Kamtschatka;
80 miles W. of Ukinfoi. N. lat. 57° 20'. E. long.
150° 44'.

TIGINE. See BENDER.

TIGIS HERBA, in Ancient Geography, a town of
Africa, in the interior of Mauritania Caesariana, near a river, and S.
of Icofium. In the Itin. of Anton, it is marked on the
route from Rufucurrum to Scalda.

TIGLUM, in Botany. See PINE NUTS, &c.

TIGNALLE, in Geography, a town of the ifland of Cor-
fica; 30 miles S.E. of Corte.

TIGNARES,
TIGNARES, a town of Brafil, and chief place in the captainship of Rio Grande.

TIGNES, a town of France, in the department of Mont Blanc; 3 miles S.E. of St. Maurice.

TIGRA, in Ancient Geography, a town of Lower Media, on the route from Viminacium to Nicomedea, between Exantapritida and Apphia. Anton. Itin.

TIGRAH, in Geography, a town of Hindooftan, in Barhar; 40 miles E.S.E. of Hajjopour. N. lat. 25° 28' E. long. 86° 7'.

TIGNANA, in Ancient Geography, a town of Asia, in the interior of Media. Ptol.

TIGNANAMA, a town of Asia, in the Greater Armenia, and one of those which were situated to the E. of the sources of the Tigris. Ptol.

TIGRANES, the Great, in Biography, king of Armenia, after having been delivered by his father as a hostage to the Parthians, was liberated and assumed the crown about the year B.C. 93. Having formed an alliance with Mithridates, king of Pontus, against the Romans, he married Cleopatra, daughter of that prince: and, according to the terms of his alliance, he reduced Cappadocia, and caufed Ariarathes, the son of Mithridates, to occupy the throne instead of Ariobarzanes, who was supported by the Romans. Soon after this event, Tigranes was offered the crown of Syria, and accepted it B.C. 83; and when he had taken posfeffion of the kingdom, governed it for many years by a lieutenant. He then invaded Leffer Armenia, and completely ruined it in the course of one campaign. Having made various other conquests, he founded the city of Tigranocerta, on the spot in Armenia where he had received the crown. He afterwards joined Mithridates, his father-in-law, in a war against the Romans; but when Mithridates, after having been defeated by Lucullus, took refuge in Armenia, he was coldly received by Tigranes, who granted him a cafe for his residence, with a royal allowance. By a series of subsequent adventures, which proved successful, Tigranes was fo elated, that he assumed the title of king of kings, and exalted from all who approached him tokens of the most humiliating reverence. A change however in his situation was rapidly approaching; for Lucullus, the Roman general, having reduced the kingdom of Pontus, availed himself of a preconcerted circumstance for marching in a hostile manner into Armenia, and laid siege to Tigranocerta. Tigranes advanced to its relief; but meeting with Lucullus at the head of a small army, an engagement ensued, the refult of which was the pufilannimous flight of Tigranes, and the dispersion of his numerous army; and though he received considerable succour from Mithridates, and levied fresh troops, he could not prevent the surrender of Tigranocerta to Lucullus; and this surrender was followed by a signal defeat of the united forces of Mithridates and Tigranes; upon which the latter prince withdrew to the remotest part of his dominions. When Pompey succeded Lucullus in the command of the Roman army, Mithridates and Tigranes, availing themselves of an interval of inaction, recovered Armenia and a great part of Pontus; but their success was interrupted by the rebellion of the son of Tigranes, who took upon himself, against his father; but being defeated, he fought refuge in Persia, and perfuaded Phraatas, the sovereign of that country, to declare war against the Armenians. Phraatas, with a numerous army under his command, compelled Tigranes to withdraw to the mountains, and besieged his capital Artaxata. The younger Tigranes being left in command of the Parthian army, was defeated by his father, who raised the fiege of Artaxata. Tigranes afterwards joined the Romans, and conducted Pompey into Armenia against his father. Unable to refit this invasion, he determined to surrender himself to Pompey, and to confide in his generosity. Upon being introduced to the presence of the Roman general, he took off his diadem, and prostrated himself at Pompey's feet. Pompey raised him, and replaced the royal diadem; and in compromising the dispute between the father and fon, restored to the former the kingdom of Armenia, and the greatest part of Mecopotamia, but imposed upon him a fine of 6000 talents for making war upon the Roman people. He was also obliged to refund the crown of Syria, which he had held for eighteen years, and likewise the provinces of Cappadocia and Cilicia. From this time Tigranes was received as a friend and ally of the Roman people; and by maintaining their friendship, he was enabled to retain his dominions in peace to the end of his life, which terminated in the eighty-fifth year of his age. Anc. Un. Hift.

TIGRANOCERTA, Sered, in Ancient Geography, a town of Asia, in Greater Armenia, at some distance to the left of the Tigris, on the river Nechoeirus, and N.W. of its mouth in the Tigris. This town was built by Tigranes, in the time of the Mithridatic war. According to Plutarch, it was large, handsome, populous, powerful, and rich. Tacitus reports that Tigranocerta was situated on an eminence, nearly surrounded by the Nechoeirus, and that it was well fortified and garrisoned.

TIGRÈ, in Geography, a small island in the Pacific ocean, at the entrance into Amiapalla bay. N. lat. 13° 10'. W. long. 88° 44'.

Tigrè, a province of Abyssinia, about 200 miles in length, and 120 in breadth. What in a special manner makes the riches of Tigré, is, that it lies near the market, which is Arabia; and all the merchandise destined to cross the Red sea must pass through this province, so that the governor has the choice of all commodities wherewith to make his market. The strongest male, the most beautiful female, the purest gold, the largest teeth of ivory, all must pass through his hand.

TIGRÍDIA, in Botany, the Flos Tigrídis of old authors, so called from its beautifully spotted corolla, resembling the skin of a tiger, or rather of a leopard or lynx. This fine Mexican plant, being known to systematic botanists from early engravings only, did not find a place in their arrangements; till Mutis sent a drawing of it to Linnaeus, under the name of Pavonia, in honour of one of his ablest pupils, Pavon, as appears by his letters; and not, as some have supposed, because of any resemblance in the spots of the flower to a peacock's tail. Being judged a Ferraria, it was referred to that genus in the Supplementum; but Jussieu, and after him Mr. Gawler, has restored the genus of Mutis, under the above name, there being another Pavonia, which the reader may see in its proper place.—Juff. Gen. 57. Gawler, (now Kew Bellenden,) in Sims and Kon. Ann. Bot. v. 1. 246. Ait. Hort. Kew. v. 4. 137. (Ferraria; Lanarick Illust. t. 569.)—Clavis and order, Monadelphie Triandra. Nat. Ord. Enfete, Linn. Gawler. Irides, Juff.

Gen. Ch. Common Sasbeath, two-edged, of two comphried pointed valves; partial ones smaller, two-ranked, alternate, single-flowered. Perianth none. Cor. superior, regular, of six petals; the three outermost ovate-oblong, acute, concave at the base, slightly contracted towards the middle; three innermost much smaller, oblong-fiddle-shaped, pointed, convex, recurved, haftate at the base. Stam. Filaments three, firmly united into a triangular, abrupt, erect column, longer than the inner petals; anthers sessile at the top of the column,
column, erect, linear-oblong, acute, converging at the points, burbling externally. *Pilf*. German oblong, abrupt, with three rounded angles; style thread-shaped, rather longer than the column of the flaments; stigmas three, slender, acute, deeply divided. *Peric*. Capsule oblong, bluntly triangular, abrupt and spurred at the top, of three cells and three valves, the partitions from the centre of each valve. Seeds numerous, nearly globose, ranged in a double row in each cell, somewhat angular from mutual pressure.


1. T. Pavonia. Mexican Tiger-flower. Redout. Liliac. t. 5. Gawler n. 1. Att. t. 1. (Ferraria pavonia; Linn. Suppl. 407. Willd. Sp. Pl. v. 3. 581. Cavan. Diff. 342. t. 18. F. An. Andr. Repof. t. 178. F. Tigridia; Curt. Mag. t. 532. Ocoloxochilus, feu Flore Tigris; Hernand. Mex. 276. Tigrisid flor; Dodon. Pempt. 693. Tier. Em. 122.)—Native of Mexico and Peru. Said to have been first introduced into the gardens of this country, about the year 1796, by Ellis Hodgson, esq. of Everton, near Liverpool, who liberally communicated it to the nurseriesmen about London, so that now few ornamental flowers are more easily obtainable. If treated as a greenhouse plant, like the Cape bulbs, the *Tigrisida* flowers in spring, ripening abundance of seeds. If planted in the open ground in March or April, the more dry or sandy the soil the better, it will blossom in succession through the autumn, at the end of which the bulbs should be taken up, carefully dried, freed from their very succulent fibres, and preserved from frost till the following spring. Though each flower lasts but one day, as every plant bears several, a plentiful succession may readily be had. The *root* is an ovate bulb, which is eatable when roasted, tasting like a chicenut; from its base are lent down several long, perpendicular, tapering, very juicy, downy fibres. *Spem* two or three feet high, erect, round, leafy, somewhat branched. *Leaves* several, erect, fowder-shaped, many-ribbed, flat-ted, smooth, a foot long. *Flower* nodorous, three or four inches broad, so splendidly variegated with scarlet, crimson, purple and yellow, that no description can do it justice. The ends of the larger petals are scarlet; their middle yellow; their base, like the whole surface of the smaller ones, richly spotted. *Stamens* and *pilif* red. It increases by bulbous offsets, as well as by seeds.

TIGRINI, ORAZIO, in Biography, a canon of Arezzo, who published at Venice, in 1588, a Musical Compendium; "Compendio della Muflica," which he dedicated to Zarlinno, from whom he received a letter of thanks for the laurel-crown with which he had bound his brows; which letter is prefixed to the work, with complimentary verfs innumerable from other friends. This Compendium is not only well digested by the author, but rendered more clear and pleasant in the perusal, by the printer, who has made use of large Roman types, instead of Italian, in which most of the books that were published in Italy, before the present century, were printed. This author is the firft, in our recollection, who has cenfurcd the impropriety and aburdity of composing music for the church upon the fubject of old and vulgar ballad tunes. The cadences which he has given in three, four, five, and fix parts, and which are good examples of ecclefiaftical counterpoint, have been almost all used by Morley, without once mentioning Tigrini's name, either in the text or catalogue of authors whom he has cited. Zarlinno, who had adopted the four new ecclefiaftical tones proposed by Glaerus, was followed by Tigrini, with whom they seem to have flopped: as no more than the eight ancient tones ap-

peared afterwards to have been acknowledged by orthodox ecclefiaftical composers; and Zarlinno himself, in the fmall editions of his works, relinquished the idea of twelve modes: as no new harmony or modulation was furnished by the additional four to the contrapuntift, without violating the ancient rules of canto-forno, which confine all its melody to the different species of octave. It appears from this Compendium, that contrapunto alla mente, or extemporary difcant upon a plain-fong, was still practiced in the churches of Italy.

TIGRIS, in Ancient and Modern Geography, a large river of Asia, which has its source in the mountains of Great Armenia, about 15 miles S. of the sources of the Euphrates, and pursues nearly a regular course S.E., until its junction with that river at Korna, 50 miles above Basforsa. Formerly these rivers disfighmed themselves separately into the Persian gulf; but they now fall into the sea by a common canal, about 70 miles S. of Basforsa. In the time of Pliny their separate beds might be seen. According to the fame author, it was named "Deglito," from its source to mount Taurus, which it traversed; and from the place of its discharge on the other side of the mountain, to the sea or Persian gulf, it was called Tigris. This author fays that it passed through the lake of Aréhufa, without mixing its waters with those of the lake. Strabo and Arrian denominated the mouth of the Tigris "Pafitigris," and Pliny gives this name to that part of the river which separated into two arms, that, after enclofing an ifland, joined again, and fell into the same bed. Mofes (Gen. ii. 14.) calls this river, as it has been fupposed, Hiddekel. The cavern of mount Taurus, through which it is faid to have paffed, was called "Zoroanda;" and as a proof that it was the fame river which entered the cavern and paffed out of it, any fubfance thrown into the river on one fide of the mountain was difcharged by it on the other.

The ancient Perifans called this river "Teer," the arrow, from the rapidity of its current; and it is now called "Degila," and "Shat-Bagad," the river of Bagdad. The united rivers of the Tigris and Euphrates are denominated "Shat-ul-Arab;" which fee.

The Tigris, though a far left noble fire than the En- phrates, is one of the moft celebrated rivers in history; and many famous cities have, at different periods, decorated its banks; among which we may reckon, in ancient times, those of Nineveh, Seleucia, Ctefiphon; and in fubfequent periods, those of Bagdad, Mofil, Diarbekir, &c.

This river is navigable for boats of twenty or thirty tons burthen as far as the mouth of the Odonneh, but no farther; and the commerce of Mofil is confequently carried on by rafts, supported by inflated sheep-kkins. The rafts are floated down the river, and when arrived at Bagdad, the wood of which they are compofed is fold without a lofs, and the kkins conveyed back to Mofil by camel. The Tigris is, on an average, between Bagdad and Korna, about 200 yards wide. The banks are steep, and, for the most part, overgrown with brush-wood, the haunts of lions and other wild beafts. The Tigris rises twice in the year; the first and great rife is in April, and is caufed by the melting of the fnows in the mountains of Armenia; and the other is in November, produced by the periodical rains. A boat, with a fair wind, will sometimes pafs from Bagdad to Basforsa in fix days, but the common paffage is from eight to ten.

The banks of the Tigris, from Tavqua-Kefra to Korna, cannot beef of a fingle village, or even habitation, with the exception of Koot, a miserable place, containing 40 or 50 mud-huts. The city of WAfth, repeatedly mentioned in the Arabian histories, is no longer a place of any confequence; it stands on the banks of the Hye, or great canal.

From Korna to the neighbourhood of Basforsa, Basforsa or 4 M.

Baira,
Table of Contents

Bafrn, there is little or no cultivation; but from thence the country bordering on the banks of the river is covered with plantations of date-trees, which continue, without interruption, almost to the mouth of the Shat-ul-Arab.

Tirandonte, a fountain of Athis, in the mountains S. of Maxome, which formed a stream that ran towards the S.E. and discharged itself into the lake Arethusa.

Tigris, in Geography, a river of China, between Canton and the sea, so called by Europeans.

Tigris, in Zoology. See Felis Tigris.

Tiguanalpa, in Geography, a town of Mexico, in the province of Nicaragua, on a river which runs into Amapala bay; 80 miles N. of Leon. N. lat. 13° 50'. W. long. 87° 36'.

Tigullaca, a town of Peru, in the diocese of La Paz; 10 miles N. of Puno.

Tigurini, in Ancient Geography, a people of Gaul, who established themselves in a canton of the Helvetians, and who joined the Cimbri when they made an attempt to pass into Italy.

Tigurinus Pages, one of the four cantons which composed the Helvetian confederacy; supposed to be Zürich.

Tigutia, a place of Italy, in Liguria, N.E. of Monflur.

Tigny, in Geography, a town of France, in the department of the Loiré; 12 miles S.E. of Orleans.

Tihan, a town of Hungary; 20 miles S.W. of Stuhlweissenburg.

Tihoe, a bay on the S. coast of the island of Bouro. S. lat. 3° 44'. E. long. 126° 27'.

Tihol, in Natural History, a name given by the people of the Philippine islands to a species of crane very frequent among them, and remarkable for its size, being taller than a man when it stands erect, and holds up its neck. They call it also sometimes tipul.

Tib, Et, in Geography, a town of Persia, in the province of Chufistan, on the Ahuaz river; 70 miles N.W. of Tiflis.

Tieguacu-Paroara, in Ornithology, the name of a Brazilian bird, of the fize of a lark; it has a short and thick beak, brown above and whitish below; its head, throat, sides, and the lower part of its neck, are of a fine yellow, variegated with red in the female, and all over of a perfect blood-red in the male; the upper part of the neck, and the whole back, are grey, with a mixture of brown; the wings are brown, tipped with white; the tail is of the same colour; and the sides of the neck, the breast, belly, and thighs, are white. Marggraves's Hift. Brasil.

Thepiranga, the name of a Brazilian bird of the sparrow kind. It is a little larger than the lark; its whole body, neck, and head, are of a very fine red or blood colour, and its wings and tail black.

There is another species also of this bird, which is of the size of a sparrow, and is of a blueish-grey on the back, white on the belly, and of a sea-green on the wings; the legs of this are of a pale grey. Marggraves's Hift. Brasil.

Tijuola, in Geography, a town of Spain, in the province of Granada; 5 miles S.W. of Purchena.

Tijuoca, a cultivated valley of the Brazils, in the vicinity of Rio de Janeiro, situated, as it were, in the bottom of a funnel, being surrounded on all sides by mountains, excepting to the southward, where a small opening admits an arm of the sea. The valley is watered by a clear stream, precipitated down a steep and broad rock of granite, forming a magnificent cascade. The soil requires little labour of cultivation: indigo, manioc, coffee, cacao or chocolate trees, sugar-canes, plantains, and orange and lime-trees growing promiscuously, and some spontaneously, in the space of twenty square yards. Coffee and indigo claim the chief attention. The temperature of the valley is very hot, on account of its confined situation and the reflection of the mountains. Fahrenheit's thermometer in the shade at 92°. Staunton's Emb. to China, vol. 1.

Tiz, or Tiz, a town of Persia, in the province of Mecran, at the mouth of the Kurene; 75 miles S. of Kidge, N. lat. 25° 25'. E. long. 60° 24'.

Tikax, a town of Mexico, in Yucatan; 68 miles S. of Merida.

Tike, the Zendat name for an otter, of which there are many to be found about that island. Phil. Trans. N° 473, fec. 8.

Tike is also used for a small bullock or heifer, for a particular sort of worm, and in Scotland for a dog.

Tikib, in Geography, a town of Denmark, in the island of Zealand; 4 miles S.W. of Helsingor.

Tikithockthock, a settlement on the E. coast of Labrador. N. lat. 56° 15'. W. long. 60° 27'.

Tikoo, a town of Bengal; 30 miles S.W. of Ramgur. N. lat. 23° 29'. W. long. 84° 55'.

Tikotschin, a town of the duchy of Warsaw; 24 miles N. of Bilefsk.

Til, a town of Persia, in the province of Adirbeiztan; 60 miles N.W. of Tauris.

Tila nav, one of the Lipari islands; 6 miles S.S.W. of Stromboli.

Tilamungalum, a town of Hindoostan, in Myore; 5 miles S. of Outfloor.

Tilborg, a town of Brabant, celebrated for its manufacture of cloth; 10 miles S. of Bois-le-Duc.

Tilburkeah, a town of Bengal; 30 miles N.N.E. of Doeca.

Tilbury, a township of Upper Canada, near lake St. Clair.

Tilbury, Welf, a village and parish in the hundred of Barfable, and county of Eflyx, England; is situated 24 miles S. by W. from Chelmsford, and 27 E. by S. from London. It appears to have been an episcopal seat of Cedd, bishop of the East Saxons, who in the 7th century propagated the Christian religion in this country, and built churches in several places, but "especially," as Bede reports, "in the city, which, in the language of the Saxons, is called Ythanecestre; and also in that which is named Tilaburgh (the first of which places is on the banks of the river Pant, the other on the banks of the Thames), where gathering a flock of fervants of Christ, he taught them to observe the discipline of a regular life, as far as those rude people were then capable." Ythanecestre is supposed to have stood at the mouth of the river Pant, or Blackwater, but has been entirely engulfed by the sea. Tilbury is now only a small village, containing, as the return of the year 1811 states, 44 houses and 17 inhabitants. A medicinal spring was discovered here in the year 1727, of great efficacy in cures of haemorrhage, fevers, and some other distempers. (See Tilbury-Water.)

The marshes in this, and the contiguous parishes, are chiefly rented by the grazing butchers of London, who generally flock them with Lincolnshire and Leicestershire wethers, which are sent hither about Michaelmas, and fed till Chriftmas, when they are conveyed to the metropolis for sale.

On the banks of the Thames, in this parish, is Tilbury-Fort, originally built as a kind of block-house by Henry VIII., but enlarged into a regular fortification by Charles II., after the Dutch had failed up the river in the year.
year 1667, and burnt three English men of war at Chatham. Various additions have been since made; and it is now strongly garrisoned, and defended by a great number of guns. Some traces of the camp formed here to oppose the threatened invasion of the Spanish armada, in the time of Elizabeth, are yet visible.—Beauties of England and Wales, vol. v. Essex; by J. Britton and E. W. Brayley.

TILbury-Water, in Medicine, is an acidulous or saline water, issuing from a spring situated near a farm-house at West Tilbury, near Tilbury-Fort, in Essex. This water is of a straw-colour, soft and smooth to the palate, but leaving, after agitation in the mouth, a small degree of roughness on the tongue; it throws up a scum variegated with several colours, which feels greasy; and effervesces with spirit of vitriol; it mixes smooth with milk, but curdles with soap; when boiled, it turns milky, but is fined by a fourth part of mountain-wine, and by acids; it operates chiefly by urine, though it is somewhat purgative, and increases perspiration. This water is esteemed for removing glandular obstructions, and hence is also recommended in fevers and cutaneous diseases; it is good in bloody fluxes, purgings, and the like; in disorders of the stomach arising from acidity, in the gravel, fluor albus, and immoderate flux of the menes. As a diuretic, it is beneficial in dropsical complaints. It gently warms the stomach, strengthens the appetite, and promotes digestion. The usual dose is a quart a-day. This water is supposed to owe its virtue to a native alkaline salt, which may be obtained from it by evaporation, and to its fixed air, which, however, being very volatile, soon exhalas when the water is heated or stands for some time exposed. Elliot’s Account of Mineral Waters, &c. p. 220.

TILCARA, in Geography, a town of South America, in the province of Tucuman; 32 miles N.W. of St. Salvador de Jugui.

TILDZ DAGHI, a mountain of Asiatic Turkey; 10 miles S. of Tocat.

TILE. See Tyle.

Tiles, Draining, in Agriculture, such as are made of particular forms and dimensions, for the purpose of draining and taking away the water that stagnates in or upon land. They are laid to constitute a very neat and convenient, as well as cheap and beneficial material for this use in a great many cases, especially as they are exempt from the common duties on ordinary tiles and bricks. They have the advantage too of being capable of being laid with much facility and dispatch, and of requiring less cutting than in the methods usually had recourse to in the common practice of freeing land from wetnesses. They are made and employed in some districts, as Cheshire, &c. with complete success and much utility.

Tile-Earth, that sort of earthy material of the strong clayey kind which is used in the making of tiles. It is also a term in farming which is sometimes employed to signify a strong, stiff, stubborn sort of land or soil that cannot be brought into cultivation, and be managed without very great labour, trouble, and expense, but which, when once reduced and got into order, is, in some cases, very productive and laiting in its returns. Vaft strength of men and teams is often requisite in working such lands as farms, as they cannot be effectually improved and got into a proper state, except by the application and incorporation of large quantities of different proper rich earthy and other suitable substances.

The farmer should always calculate well before engaging farms confining greatly of this sort of land or soil.

The general opinion among the most attentive and diligent farmers in the county of Essex is, that even the

pallure lands upon the wet, cold, tile-earth bottoms, should be kept under the plough two or three years in twenty, in order to render them in the most suitable and productive state.

Tile, or Tyle, in Allying, a small flat piece of dried earth, used to cover the vessels in which metals are in fusion.

There are made of a mixture of clay and sand, or powder of flints, or broken crucibles, made into a paste, and spread thin with a rolling-pin, on a table or flat stone. From these cakes or plates, pieces are to be cut with a knife, to the shape and size of the mouths of the vessels to be closed. It is best then to pare away the borders of the under surface of the piece thus cut off, that this surface may immediately touch all the way the edge of the mouth of the vessel, leaving a prominent rim, by which means the tile fits close upon the vessel, and is not so easily displaced by accidents, as a touch of the poker, or of the coals put on to mend the fire, as it otherwise would be. Finally, put on the middle of the outer surface a small bit of the same matter, which serves as a kind of handle, by means of which it may be conveniently managed by the tongs, and easily taken off and put on again at pleasure. Cramer, Art. Alfi. p. 66.

TILENUS, DABLE, in Biography, a doctor and professor of theology at Sedan, in France, was born in Silefia, in 1563, and was the first foreigner who wrote against Arminius, though he afterwards changed his opinion and supported the doctrine of that theologian. He also took part in a violent controversy with Du Moulin. A reconciliation was attempted between the disputants, in which the elector palatine, the duke de Bonilac, and king James I. of England, interposed; and a national synod of the French churches was held for this purpose at Tonneins in 1614. The attempt to produce a pacification failed; and TILENUS was deprived of his professorship in 1619 or 1620. He then removed to Paris, and afterwards maintained for five days, at Orleans, a disputation with John Cameron on grace and free-will. In a letter addresed to the people of Scotland, he accused the Presbyterians of introducing too many changes in the form of their religion, and praised the people of England for admiring episcopacy. King James I. cauconf this letter to be printed, and invited the author to England, with an offer of a penion. TILENUS accepted the offer; but returning to France in order to arrange his affairs, an outcry was in the meanwhile raised against him in England, and he therefore determined to remain at Paris, where he died in 1633. He was the author of many works in Latin and French, which it is needless to recite. Gen. Diog.

TILGUN, in Geography, a town of Asiatic Turkey, in Caramanias; 36 miles E.N.E. of Akkahir.

TILHARA, a town of Hindooan, in Rohulcan; 30 miles S.S.E. of Berilly.


Gen. Ch. Cal. Perianth inferior, of one leaf, in five deep, concave, coloured, deciduous segments, about as large as the corolla. Car. Petals five, alternate with the calyx, oblong, obtuse, crenate at the summit. Nectary a scale at the base of each petal, not universal. Stem. Filaments numerous,
Tilia.

anthers, thread-shaped, the length of the corolla; anthers of two nearly orbicular discurvated lobes, bursting outwards.

pijn. German superior, roundish; style thread-shaped, the length of the flaminis; stigma obtuse, with five angles.

peric. Capsule globose, angular, coriaceous or membranous, bursting tardily at the base, of five valves and five cells.

seeds solitary, roundish.

obst. Two or three of the cells are generally abortive and obliterated. The nectary seems confined to the American species.

eff. ch. Calyx in five deep segments, deciduous. Petals five. Capsule superior, roundish, angular, of five cells, and five valves.

An important genus, of useful, as well as ornamental, hardy deciduous trees. The bark serves for cordage, and for those very serviceable mats, manufactured in Russia, so well known to our gardeners, and so useful for packing. The smooth, soft, white, clove-grained wood is esteemed by carvers, and was preferred by the inimitable Gibbons, for those feloons of flowers, fruit, dead game, &c. with which his free and expeditious hand adorned most of the great houses in England. The leaves are sometimes given to cattle in seasons of scarcity in the North. The whole plant abounds with mucilage, and the sap is reported to afford some fugar. Nothing is more deliciously fragrant than the flowers of the whole genus, which were frequent in great numbers, as they yield plenty of honey.

section 1. flowers without the scaly nectaries. European species.

1. T. europaea. Common Smooth Lime-tree. Linn. Sp. Pl. 733. Willd. n. 1. Ait. n. 1. Fl. Brit. n. 1. Engl. Bot. t. 610. Fl. Dan. t. 533. (T. platyphylos; Scop. Carn. v. 1. 375; Venten. n. 2. T. vulgarius platyphylos; Bauh. Hist. v. 1. p. 2. 133. Rail Syn. ed. 2. 316. T. femina; Ger. Em. 1483. Nectaries none. Capsule coriaceous. Leaves heart-shaped, undivided; smooth and somewhat glaucous beneath, with the branching of their veins woolly. Branches and footstalks smooth. Native of woods and the borders of meadows, or the slopes of hills, in various parts of Europe, from Sweden to Greece, flowering early in July. A tall upright tree, with smooth, spreading, round branches, green when tender, afterwards brown. Leaves alternate, on longish stalks, pointed, sharply serrated, almost orbicular, about three inches in diameter, entire at the base, and their fides rather unequal or oblique in that part: their upper surface of a full bright green, quite smooth: under paler, somewhat glaucous, with a yellowish prominent midrib, and several other ribs, either opposite from the central one, or radiating from the base, subdivided, connected by parallel tranverse veins, all smooth as well as the surface of the leaf, except at the base of each side-rib, where is a small, depressed, axillary, fringe-like tuft of hairs. stipules none. Flower-stalks axillary, solitary, shorter than the leaves, smooth, slender, each bearing an irregular umbel or cyme of yellowish flowers, and very remarkable for a large, solitary, oblong, obtuse, entire, veiny bracteas, of a pale greenish hue, and smooth surface, united firmly to the stalk, and falling off with it. The germen is very woolly. Capsule obovate, or angular, especially when it ripens more than one seed, which is not often the case. The flowers are delightfully fragrant, especially at night. This is the kind of Lime most usually planted for avenues, nor can any thing be more desirable for that purpose. It appears to have taken place of our more ancient elms in king William's time, when also it was equally popular in France. The branches naturally feather down to the ground, but will bear clipping without injury. The leaves fall perhaps the first of all our native trees, especially in the squares of London, where the Lime nevert heless bears the smoky atmosphere tolerably well.

Whether the T. ulmifolia, femine hexagona of Merrett, mentioned by Didennius in his edition of Ray's Synophs, 473, be a variety of this, with more perfect fruit, or of any other species, we have no means of determining.

2. T. corallina. Red-twigged Downy Lime-tree. (T. europaea; Ait. Hort. Kew. ed. 1. v. 2. 229; ed. 2. n. 1. 6; Fl. Brit. n. 1. T. grandifolia; Ehrh. Arb. n. 8. T. folis mollitirh hirtifus, viminibus rubris, fructu tetragonoto; Rail Syn. ed. 2. 316. Nectaries none. Capsule coriaceous. Leaves heart-shaped, undivided; downy beneath, with the branching of their veins woolly. Branches and footstalks downy. Native of various parts of Europe. Plentiful in Stokenchurch woods, Oxfordshire, where it was first noticed by Bobart, and where its shining red twigs are very conspicuous. This character, however, is not invariable. We have the same species in Norfolk with brown twigs, and it seems to be often planted indifferently with the former. They have not yet been separated as species, nor did Ehrhart, in publishing the present under the appellation of grandifolia, mean any thing further than to distinguish it, in common with the foregoing, from his parvisepala, hereafter described. We therefore prefer an older and less ambiguous name. Professor Mertens, who has studied these trees in Germany, observes that corallina flowers a fortnight earlier than europaea. As to their specific difference, it appears chiefly to depend on the fine soft hairs, which clothe the backs of the leaves, and especially cover their ribs, fringing their minutest veins in a delicate and regular manner. These hairs are condensed into little axillary tufts, at the origin of each principal vein. In the inflorescence or flowers we perceive no material difference. The capitule has four or five angles. The famous old Lime in the church-yard of Zellitz near Gutenberg, in Bohemia, which is said to have borne hooded leaves, since a parcel of monks were hanged upon it, proves, by an authentic specimen sent us by professor Jacquin, to be this species, not the foregoing.

3. T. parvisepala. Small-leaved Lime-tree. Ehrh. Arb. n. 36. Pl. Off. n. 125. Sm. Engl. Bot. t. 1705. Ait. n. 2. "Schkuhr Handb. v. 2. 72. t. 141." (T. microphylla; Venten. n. 1. Sav. Etr. loc. 1. 152. T. europaea; Fl. Brit. n. 1. T. ulmifolia; Scop. Carn. v. 1. 374. T. fylvefirs; Trag. Hist. 1111. T. folio minore; Bauh. Hist. v. 1. p. 2. 137. Rail Syn. ed. 2. 316. T. bohemica, &c.; Till. Pl. 165. t. 49. f. 3. )—Nectaries none. Capsule roundish, very thin. Leaves heart-shaped, sharply serrated, somewhat lobed; smooth and glaucous beneath, with dense, axillary or scattered, tufts of hair. —Native of Germany, Carniola, Switzerland, Italy, France, and England. Ray says it frequently occurs in Essex and Suffolk, as well as in Lincolnshire and elsewhere. It flowers a month later than even the first species, not being in full perfection before August. The leaves are but about half the size of either of the foregoing, their ferratures sharper, tufts of axillary hair larger, and often accompanied by large hairy blotches. Footstalks slender, and often of a longer proportion, quite smooth. Flowers smaller, smelling like a Honeyflick. Capitule small, roundish, scarcely angular, rarely perfecting more than one seed, its coat thin and tender compared with either of the former species, on which circumstance M. Ventenat chiefly founded its distinct character. We do not find that part so unlike them in firmness, as in thickness; but we have no doubt of the species being perfectly distinct. By planting this intermixed with the others about houses, in avenues, &c. a longer
TILIA.

longer succession of fragrance from their blossoms might be obtained.


4. T. americana. Broad-leaved Lime-tree. Linn. Sp. Pl. 733. Willd. n. 2. Ait. n. 3. (T. glabra; Venten. n. 3. "Mem. de Pinif. v. 4. t. 2." Pursh n. 1. T. canadensis; Michaux Boreal.-Amer. v. 1. 306.)—Neetaries present. Leaves orbicular-heart-shaped, abrupt with a point, sharply serrated; their veins minutely hairy beneath. Petals abrupt, crenate. Capsule ovate, somewhat ribbed. In the woods of Canada and the northern United States, and on the mountains, as far as South Carolina, flowering in May and June. It is known by the name of Lime-tree or Line-tree, Bafe-wood, or Spoon-wood, and is both useful and ornamental. Pursh. Kalin first made the plant known to Linneas, and it was suppos'd by him to be the only American species of Tilia. The stem is laid to be eighty feet high. The branches are brown, smooth. Leaves larger than any of our European species, and of a more orbicular or rather elliptical form, abrupt rather than heart-shaped at their base; of a fine green above, turning red in autumn; much paler beneath; finely veined and smooth on both sides, except that all their veins are minutely hairy (not fringed like T. cordifolia) beneath, and even the smaller ones, as well as the larger, are furnished with little auxiliary hairs. Flowers corymbose; their common stalk about twice the length of the footstalks. Petals, according to Ventenat, abrupt, and toothed towards the end. We have not examined the flowers.


6. T. pubescens. Hoary Lime-tree. Ait. n. 4. Willd. n. 3. Venten. n. 4. "Mem. de Pinif. v. 4. t. 10. t. 3." Pursh n. 3.—Neetaries present. Leaves heart-shaped, pointed, coarsely serrated; abrupt and unequal at the base; downy beneath. Panicles forked, compound. Petals acute.—In clove copses, and on the banks of rivers, from Virginia to Georgia, flowering from May to July. Pursh. Its thinner-leaved variety was long ago brought from Louisiana to the Paris gardens, and Jussieu gave it the name of multiforma, which is very apt, but has never been published till lately. Cateley is reported to have introduced this species into England before the year 1726. If our memory does not deceive us, it is to be met with at Bulletrode, and in other old plantations, and the flowers are more highly fragrant than any others of the genus. Its growth is laid not to be so lofty as that of T. americana. The leaves are smaller, obliquely heart-shaped, with very broad and pointed serratures; their under side extremely soft to the touch, but not white, though paler than the upper, and somewhat hoary. There are scarcely any auxiliary tufts of hair to the veins, except on the older denudated leaves. Flower-stalks twice as long as the footstalks, branched at the top into a forked, spreading, downy panicle of numerous flowers. The petals are rather pointed, as Ventenat describes them; and not emarginate, as in his and Pursh's specific definition. We readily concur with these authors, that the Louisiana tree, called multiforma, is a mere variety, and but a slight one. Our description of the inflorescence and flowers is taken from this variety. It is hardly necessary to mention that all these American Lime-trees bear the same peculiar fort of bractea as those of Europe.

7. T. alba. White Lime-tree. Ait. n. 5. Willd. n. 4. "Wald坐. et Kitaib. Hung. t. 3." Jacq. Hort. Schoenbr. v. 3. 18. t. 283. (T. rotundifolia; Venten. n. 5. "Mem. de l'Inst. v. 4. 12. t. 4."—Neetaries present. Leaves deeply heart-shaped, obscurely lobed, sharply serrated; downy and white beneath.—Native of woods in Hungary. Willdenow. Found by Bruguier and Olivier near Conftantine, Ventenat. It was erroneously reported by our gardeners to come from America, as every new plant, at one period, was supposed to do. More recently, every novelty has been attributed to Botany Bay.—This is a hardy tree in England, but does not flourish so well as any of the preceding. The deep, and more even, heart-shaped figure of the leaves, and their snow-white under surface, readily characterize this species. Its light-yellow, cymose or panicled flowers are said to have the scent of a jonquil.

8. T. heterophylla. Various-leaved Lime-tree. Venten. n. 6. "Mem. de l'Inst. v. 4. 16. t. 5." Pursh n. 4. (T. alba; Sm. Inf. of Georgia, v. 1. 21. t. 11.)—"Leaves ovate, sharply serrated; white and downy beneath; either heart-shaped, or obliquely, or equally, abrupt, at the base. Capsule globose, obscurely ribbed."—On the banks of the Ohio and Missiliphi, flowering in June. A very handsome and desirable ornamental tree. Pursh. Ventenat says it is distinguished from the last by many characters. The young branches, and buds, are smooth, of a purple colour inclining to black. Leaves delicately serrated, pointed, with tufts of reddish axillary hairs to the veins. Flower-stalks almost as long as the leaves, being thrice the length of T. alba. We have seen no specimen of this species, but it has probably been introduced into the gardens by some of our collectors from America. It is extremely likely to be the Warhew of Mr. Abbot, in our Inflets of Georgia, t. 11; which from the above-mentioned error of the gardeners respecting T. alba, we supposed could be no other than that species, now known not to grow in America. The Warhew is said to be very like the European Lime-tree, except being always a low bush or shrub. Mr. Abbot's figure answers so well to Ventenat's and Pursh's definitions, as to leave scarcely a doubt on the subject, except only that the latter speaks of T. heterophylla as an ornamental tree. It may attain a greater size in one part of the country than in another.

We feel much regret in rejecting our late esteemed correspondent M. Ventenat's suppos'd improvements in the nomenclature of the species of Tilia. But besides their appearing to us uniformly for the worse, as usual in all such alterations that ever came in our way, we greatly prefer established names; which though occasionally erroneous or ambiguous, have generally acquired associations that compensate for any defects.

TILIA, in Gardening, contains plants of the ornamental tree kind, among which the species most cultivated are, the European lime-tree (T. europea); the broad-leaved American lime-tree (T. americana); the pubescens Carolina lime-tree (T. pubescens); and the white lime-tree (T. alba).

The first sort, though little used, is a handsome tree, having a smooth taper straight trunk, and the branches forming a beautiful cone. The foliage is also smooth and elegant: it grows to a very large size, and affords good shade: it makes a fine detached object in parks and open lawns, planted singly: the branches are so tough as seldom to be broken by the winds, and the flowers have a delightful fragrance: the wood is soft, but capable of being turned into light
light bowls and dishes, &c. There are several varieties of
it, as the narrow-leaved, the broad-leaved, the elm-leaved,
the red-twiggled, the smooth small-leaved, the smooth
large-leaved, the soft hairy-leaved, the wrinkled-leaved,
and the striped-leaved.

Cultures.—These trees may be increased by seeds, layers,
and cuttings. The seed, when ripe in the autumn, should
be beaten down, keeping the green-twiggled and red-
twiggled kinds separate; and be sown soon after, or
prefered dry and found till spring; sowing it in a bed or
border of common earth; previously digging the ground,
and dividing it into four-feet wide beds; drawing the earth
off the surface evenly, about an inch deep, into the alleys;
then sowing the seeds thinly, touching them lightly down
into the earth with the back of the spade, directly earthing
them over to the above depth.

When they come up in the spring, the beds should be
kept clean from weeds, giving moderate waterings in dry
weather, to forward the plants in growth as much as possible,
in order to be fit for planting out in nursery-rows by the au-
tumn or spring following; though, if they have not root rather
weakly, they should stand another year, then be planted out
in rows two feet wide and a half afunder, by eighteen inches di-
tance in the lines, to remain three or four years more to
acquire a proper size for the purposes intended, trimming
off the large side-branches from the lower part of the stem
occasionally, to encourage their aspiring more expeditiously
at top, which should be suffered to remain entire: these
plants, when raised from seed, generally assume a more hand-
fome and expeditious growth than such as are raised from
layers and cuttings. When they are from about five or six
to eight or ten feet high, they are of proper size for final
planting out; though, when digged as forest-trees for timber, it is advisable to plant them finally while they are
young, as more than from three or four to five or six
feet high.

They are all raised readily by the layer method; and for
this purpose proper flushes must be prepared, and the young
shoots of a year or two old are the proper parts for being
laid down, which should be performed in autumn or winter,
by fit-laying, shortening the tops of each layer within a
little of the ground: they are mostly rooted by the autumn
following, and fit to plant out in nursery-rows, being then
manured as the seedlings.

When cuttings are employed, the strong young shoots of
the year should be chosen in autumn or spring, and planted
in a moist good soil; or any scarce sorts may be planted
several together in pots, and plunged in a hot-bed, as they
more readily strike root in that way.

These two last methods are the proper ones for raising
the varieties with certainty.

These trees are of a quick handsome growth, and succeed
in almost any soil and exposure. They are some of them
employed for their fine appearance, others for the exquisitely
sweet smell of their flowers, and most of them for the use
of their wood. The plants of them are also occasionally made
use of in forming hedges in particular situations, but they
are not by any means well calculated for this purpose.

As timber trees, their wood is found highly valuable on
account of its softness, lightness, and toughness, for the making
of various sorts of household utensils, as bowls, basins,
&c. as well as for different purposes in the business of carving,
gilding, turning, spining, &c.

All these trees afford ornament and variety among other
deciduous trees in the shrubbery, plantations, &c.

TILLIACEÆ, in Botany, a natural order of plants, the
seventy-ninth in Jussieu's system, or the nineteenth of his thir-
teenth clas, of which Tilia, the Lime-tree, is an example.
See GNERIA for the full characters of this thirteenth clas.
Those of the order in question are thus given.

Galax either of many leaves, or in many deep segments.
Petales definite, diminutive, (wanting in Shanesia,) alternate
with the segment leaves of the calyx, and for the most part
agreeing with them in number. Stamens generally indefinite
in number, and distinct. German simple. Style frequently
single, rarely either multiplied, or wanting. Stigma either
simple or divided. Fruit in some instances pulpy; in others
capsular, mostly with several cells, having one or many
seeds in each, the partitions from the centre of each valve.
Corollum of the seed flat, surrounded by a fleshy albumen.
Stem arborescent or shrubby; rarely herbaceous. Leaves
alternate, simple, accompanied by stipules.

Section 1. Staminæ definite in number, more or less com-
bined in their lower part, or at the very base. These are
termed by Jussieu "double Tiliae." They consist of
Waldenia, Hermannia, and Mabernia.

Sec. 2. Staminiæ differ 들어 indefinite. Fruit of many
ells. Genuine Tiliae

Antichorus; Cordycus; Helicia; Triangula; Spar-
mannia; Shanesia; Aipeia of Aublet, which is Aepilia
of Schreber; Muntingia; Flacourtia of L'Heritier; Oenoba
of Forlank, Lamarck Illhfr. t. 471; Sturjus; Grewia; and
Tilia.

Sec. 3. Staminiæ nulli, indefinite. Fruit of one cell.
General allied to Tiliae.

Bisa; Laetia; and Banara of Aublet and Schreber.

The author hints that this order might possibly, with pro-
priety, receive a reinforcement of several polytelas polypo-
dandous genera, at present not well understood, and there
fore annexed to other orders, among which he and in
doubt. He names Sorania of Aublet (see Mappia); Car-
tina of the same (see Doliocarpus); Cleyera of Thum-
berg (see Ternstroemia); Vallea of Linneus; Dicerca
of Porter (see Elrocarpus); Coipaia, Mabernia (see Bonvelli);
Hosmiia (see Mryndenorum); Vantanea (see Lenniscia)
all of Aublet; and Trilæ of Linneus.
The reader will be able to form his own opinion on these
matters, by turning to these articles in their proper places,
much of the genera and their affinities having become better
known since the publication of Jussieu's work.

The characters of his Tiliae are hardly to be distinguis-
hed from those of his next order Ciflæ, the principal difference
confiding in the straight corollum, and more copious albumen,
of the former.

TILLLABARUM, in Ancient Geography, a town of
Africa Propria, upon the route from Tacape to the Greater
Leptis, between Thebelamum and Adaghmagdum. Anton.
Itin.

TILLÆA, in Botany, was dedicated by Micheli (followed
by Linneus) to the honour of his friend and fellow-labourer
Michael Angelo Tili, who published a splendid and rich
catalogue of the garden of Pisa, of which he had the care,
in 1723. He was a member of the Royal Society of
London, as well as of the Botanical Society of Florence,
and corresponded with the chief botanists of his time, in
England, Holland, and elsewhere. He travelled to Con-
Succulenta, Linn. Semperivina, Juss.

Gen. Ch. Cal. Peria inferior, in four deep, flat,
ovate, large segments. Cor. Petals four, ovate, acute, flat,
rather
rather smaller than the calyx. Stem. Filaments four, simple, shorter than the corolla; anthers small, roundish. Petals four; style simple; stigma obtuse. Perci Capsules four, oblong, pointed, reflexed, the length of the calyx, burbling longitudinally along the upper edge into two valves, with one cell. Seeds two, or many more, in each cell, ovate.

Obf. T. muscofa has the parts of fructification usually in three, not four. Gertner discovered its flowers to be sometimes even five-cleft. He justly remarks, that such differences of number are in this natural order of little importance, and that Tillaea differs from Cragfalia in nothing but the want of nectariferous scales below the germs.

Eff. Ch. Calyx in three, four, or five segments. Petals as many. Nectaries none. Capsules three, four, or five, burbling inwards. Seeds several in each capsule.


3. T. Vialissii. Stalked French Tillaea. Willd. n. 3. (Sedum minimum annuum, flore roso tetravapalo; Vaill. Paris. 182. 1. 13. t. 3.)—Stem erect, much branched. Leaves ovate, clasping the stem, shorter than the flower-stalks.—Native of France. Observed by Vaillant, in the forest of Fontaines-Poues, where water has stagnated in winter, flowering in March to August. Root annual, of a few small tufted white fibres. Stem an inch or two high, repeatedly branched, scarcely forked, purplish. Leaves in pairs creasing each other, very thick, pointed, gibbous underneath, dark green, about two lines long. Petals four, rose-coloured, with a dark-coloured mid-rib. Seeds numerous, black, very minute.—The broader thicker leaves, and the much longer flower-stalks, render this very distinct, as Wildenow observes, from T. aquatica.

4. T. peduncularis. Long-stalked Brazil Tillaea.—Stem erect. Leaves lanceolate, acute. Flower-stalks often twice the length of the leaves. Capsules abrupt.—Gathered by Commeron, in marshy spots that had been overflowed, at Monte Video. This grows in tufts, and has very much the habit of T. aquatica, for which possibly it may have been taken. There appears nevertheless much difference between them. The whole herb, in the present instance, is red, and the flowers rose-coloured, growing on long stalks, which, though indeed variable, are never less than half the length of the leaves, and often twice their length. The shape of the leaves agrees with aquatica; but the capsules when expanded are more abrupt, and even irregularly heart-shaped.


Stems procumbent, branched. Leaves obtuse. Flowers mostly three-cleft. Calyx and petals taper-pointed.—Native of sandy barren ground in the more temperate parts of Europe, flowering in summer. Abundant on sandy heaths near Norwich, Bury, Brandon, &c. The variety 3 is brought from Africa, from Lima, and even from New South Wales. We can find no difference in the dried specimens, except their being larger than our's, with somewhat of a glaucous hue, and the flowers partly flaked, more numerous, and all, as far as can be examined, five-cleft and pentandrous, just like Gertner's plate of T. muscofa.

The British specimens of the muscofa are from one to two inches high, strongly tinged with a blood-red, ascending, branched, with a fibrous annual root. Leaves elliptical, thick, obtuse, somewhat channelled above; clasping their stem at the base. Flowers mostly three-cleft, sessile; their petals white, with a taper red point, less than the calyx. Seeds only two in each capsule.

We scruple to retain in this genus four other species admitted by Willdenow. The first is T. capenfa, Linn. Suppl. 129. Willd. n. 4; evidently, as Thunberg calls it, a Cragfalia, by its purple triangular nectaries, though, on account of its four-cleft flowers, made a Tillaea by Linnaeus and Willdenow.

T. perfoliata, Linn. Suppl. 129. Willd. n. 5; T. umbellata, Willd. n. 6; and T. decumbens, Willd. n. 7; all referred to Cragfalia by Thunberg, have none of them fallen under our inspection; but as Willdenow avows having been guided by number, we have no scruple in removing them hence.

So also Cragfalia muscofata, Forst. Magell. 167; gathered by that author, as well as by Commeron, Menzies, Banks, and Solander, at Staten land, is most certainly a Cragfalia, because of its nectaries; though, on account of its four-cleft flowers, it has been taken by some great botanists for a Tillaea.

**TILLAGE**, in Agriculture, the practice of tillimg or cultivating land, especially of the arable kind, or the means of bringing it into a state of preparation for the growth of different sorts of arable crops.

Of all the arts, says Vattel, tillage, or agriculture, is the most useful and necessary. It is the nursing-father of the state. It forms the surest resource and the most solid fund of riches and commerce, for people who enjoy a happy climate. This object, therefore, deserves the utmost attention of government: and it ought carefully to avoid every thing capable of discouraging the husbandman, or of diverting him from the labours of agriculture. Those taxes, those excessive and ill-proportioned impositions, the burden of which falls almost entirely upon the cultivators; and the vexations they suffer from the commissioners who levy them, take from the unhappy peasant the means of cultivating the earth, and depopulate the country. Spain is the most fertile and the worst cultivated country in Europe. The church poffeffes too much land, and the undertakers of the royal magazines, who are authorized to purchase, at a low price, all the corn they find in the possession of a peasant, above what is necessary for the subsistence of himself and
is, finally, to greatly discourage the husbandman, that he sows no more corn than is necessary for the support of his own household. Whence frequently arises the greatest scarcity in a country capable of feeding its neighbours.

Another abuse injurious to agriculture is, the contempt cast upon the husbandman. The inhabitants of cities, even the most servile artists, and the most lazy citizens, consider him that cultivates the earth with a disdainful eye; they humble and discourage him. They dare to despise a profession that feeds the human race; the natural employment of man. A little insignificant mechanic places far beneath him the beloved employment of the first confuls and dictators of Rome. China has wisely prevented this abuse; agriculture is there held in honour, and to preserve this happy manner of thinking, every year, on a solemn day, the emperor himself, followed by his whole court, sets his hand to the plough, and fows a small piece of land. Hence China is the best cultivated country in the world: it nourishes an innumerable multitude of people, that at first appears to the traveller too great for the space they possest. Besides, the cultivation of the soil is an obligation imposed by nature on mankind.

The most proper forts of soils for the purposes of tillage-cultivation, are all those of the more dry and friable kinds, whether the depth of earth or mould, or what is often termed flake in them, be only light or considerable; as under different circumstances these differences fit them for the production of different forts of crops, the methods of cultivation in which are fully explained under their different proper heads.

In this view, all the various denominations of light soils, such, for instance, as gravels, sands, light chalks, and thin loamy lands, are well adapted, in most cafes, to the purposes of tillage, from their being, in general, pretty well suited to the various forts of grain, as well as to the raising of such green and root-crops as are necessary in the support and management of different kinds of live-flock. The more deep, loamy, chalky, and gravelly forts of land, where they can be kept sufficiently dry, and in a proper state, during the winter season, may likewise, in many cafes, be well employed in tillage-cultivation, especially when they do not produce and afford an abundant and useful fort of herbage for the keeping of animals, or other uses. All the lands of the sward-kind, or in the state of grats, which are liable to be infected with the mois-plant, or to become over-run with a moffy covering, may, in common too, be managed under the tillage-sytem with much advantage, and better than in such a state of grats.

In some cafes, lands may be suited to convertible tillage, or alternately that of grain and grats, with vast benefit to the farmer. It has been remarked on this fort of tillage by a late writer, that land may in this way often be turned to better account by ploughing and tilling it eight or ten years, and then laying it down to grats, in order to take up another part or portion, than by the common method, but especially where the land is subject to ant-hills; as the paring and burning destroys all such hills, and such land is sure to bring abundant crops of corn. And that there are very few situations that have dry land and soil fit for the plough, but what would bring more profit under tillage than by lying in the state of old grats; for when such good land as this is well laid down to grats, with plenty of good proper feeds, after a course of tillage, an acre of it will keep as much flock as four acres would which were produced in the natural way, and this is what makes its great value. Such tillage-land as this, it is said, is worth more money than the finest grats-land in the kingdom; as, on the fine marshes so much boasted of, the earliest of the summer-flock comes to market at the very time when all forts of vegetables are in plenty, such as peas, beans, and many others, and when meat consequentially is sure to fall in price; and great numbers of grats-fed beasts, or cattle and sheep, come together. Besides, the very best grats-lands send only two sheep in the two early months of April and May from an acre; but the best tillage-land will send ten from an acre, and have them ready any time in the winter, when meat is the dearest. Thus, it is contended that ten acres of turnips will send one hundred sheep in the dearest time to the market, but that it will take fifty acres of the best land in grats, to send the same number to the market.

It is therefore concluded that, in this way, the tillage-farmer sends three hundred acres of corn to market, and as many fat sheep besides, acre for acre, as the best grazing-land; and that by still other improved methods of management, as that of the culture of flax for the use of the feed in fattening live-flock, and some others of a similar description, the tillage-farmer may derive greater profit than by the turnip practice, from the large quantity of winter-fattened animals, and the vast supply of dung or manure which is thus raised and provided.

Although the necessity of good tillage in the preparation of land for cropping be now pretty well understood by the practical farmer, and has been inculcated occasionally under different heads in the present work, it requires to be well explained in some of its procceses. It has indeed been observed in the Agricultural Survey of the County of Hereford, after noticing that the Romans were convinced of the good effects of this fort of preparation, as Pliny has remarked the advantages of frequent ploughing and turning over the soil in Tuscany; and that, in this country, Evelyn suggested its power of so altering a soil from its former nature, as to render the hardest and harshest as well as most uncivil clay obsequious to the husbandman; that tillage also destroys weeds, and reduces the earth to small particles, rendering it sufficiently loose and porous to admit of the cafy growth and extension of the roots and fibres of the grain to be cultivated in or upon it. And that the spade is well adapted to these purposes, because it moves the ground eight or ten inches deep, turns it upside down, and covers the weeds with a quantity of earth, under which they rot, and contribute towards its fertilization and improvement; and that this mode is founded on the just idea or notion of the Flemings, that a farm should resemble a garden as nearly as possible. But that as the spade method is much too tedious and laborious, as well as too expensive, to be practised on the larger scale of a farm, the plough is therefore subtiltuted, as cheaper and more expeditious, but that, in general, it does not till the earth to deeply, and often moves it in large bodies or maffes, without sufficiently breaking it into pieces. In order to remedy this inconvenience, the celebrated Mr. Tull, is said, recommended a plough of his own invention, which had four coulters instead of one, and thus divided the earth raised by the shares into several narrow strips; but the resistence occasioned by the additional coulters was found to require a greater strength in horses than the profits of the experiment and work would warrant. It was, however, afterwards ascertained by a distinguished foreigner, Mr. de Chateauneuf, that the breadth of the furrow should be proportioned to the fineness of the soil or land; and that thus the resistence may be regulated on all kinds of land or soil. But the operation of repeated crosses-ploughing, and the use of other tools, as now generally practised, aided as they are by full expoure
exposure to frost, rain, &c. to effectually break down the hardest clods, that other measures are, it is thought, rendered less necessary. Since the above was written, however, many useful instruments have been formed, by which tillage-cultivation is not only rendered more effective, but more easy and expeditious, as may be seen by the descriptions which have been given of them under their different proper heads. See Drag, Scarifier, Scurifier, Spike-Roller, &c.

M. Duhamel has since too observed in his "Elements of Agriculture," that some believe it is more advantageous to increase the fertility of land by frequent ploughing and other means than by manure; because, in general, only a certain quantity of manure can be procured; as twenty acres of land will, in common cafes, scarcely produce as much manure as is necessary for five; whereas the particles of the earth may be divided and subdivided almost to infinity. The aids, therefore, which are derived from manure, must, it is supposed, be limited, whilst no bounds can be set on the benefits that may accrue from ploughing or breaking down and reducing the parts of the soil. This appears, the writer thinks, to be over-rating the advantages of breaking the soil down in other ways; but, it is certain, that when the particles of land or soil adhere to closely together as to impede the extension of the roots of plants, income of the food and nourishment they require, the plants themselves cannot grow with proper vigour, or yield a proper produce. This is therefore to be corrected by frequent ploughings, &c. And that, lastly, repeated ploughings and other such means enable the land to receive and retain all the benefits to be derived from the floating vapours and dews of the atmosphere, which falling on hard ground, where it cannot readily penetrate, is quickly exhaled by the next day's sun and wind.

Notwithstanding these remarks, it may, however, be noticed, that no tillage or breaking down of the parts of the soil, though ever so complete and effectual, can wholly supply the place of manure, although it may greatly contribute, in different instances, to affist its fertility.

These are some of the more general and particular ways in which tillage becomes so essential and effectual in promoting the fertility and improvement of land; but there are a few others, the procresses of which may be seen under their proper heads.

In the tillage-cultivation for most sorts of crops of the grain or corn kinds, as well as some others, it becomes effectually necessary that the soil should be reduced to a very considerable degree of fineness, or what is frequently termed tilth by writers on husbandry; as, where this is not the case, they cannot be so well provided with food or nourishment, or be kept so perfectly and so sufficiently clean and free from weedy matters. There are other reasons too that require, at least, the more superficial parts of the soils to be in a fine condition of tilth for the receiving of such crops, which are those of the young tender roots of the new rising plants being thereby rendered more capable of fixing themselves perfectly in the mould which is produced, and of their drawing from it a more regular supply of food, in consequence of the more equal diffusion of moisture and other substances through it, which must necessarily take place. Besides, it is favourable in other ways, as by such tillage the seed-corn is not only more capable of being perfectly but equally covered, in consequence of which the vegetation and growth of the young plants of it are more equal and expeditious.

But besides the rate and condition of the soil or land in regard to tilth, it should be in a suitable situation in respect to dryness; as where there is too great a degree of moisture in it, the tillage can neither be performed in a proper manner, nor the feed-corn be put in without the danger of sustaining injury by becoming rotten before the vegetative processes take place, as not unfrequently happens to pea and other garden crops, when put into the soil during the moist winter months: and where, on the contrary, the land is too dry a rate, the tillage is improper to be effectual, as causing too much exhalation, by which the feed-corn, when put in at such periods, may be much injured by the want of that moisture which is necessary for perfect vegetation. Under the last circumstances too, it may be more liable to be destroyed by worms, grubs, and other insects. On these accounts the arable farmer should, of course, be equally attentive to the tillage preparation of the soil, and the condition in which it may be cropped to the greatest advantage, and with the greatest chance of success.

The writer of the "Elements of Agricultural Chemistry" states, that in all cafes of tillage, the feeds should be put in so as to be fully exposed to the influence of the air. And that one cause of the unproductiveness of cold clayey adhesive soils is, that the feed becomes coated with matter impermeable to air. All immediate tillage, for putting in crops, should consequently be performed as much as possible in suitably dry weather on such sorts of land.

In sandy soils, he says, the earth is always sufficiently penetrable by the atmosphere; but in clayey soils there can fearfully be too great a mechanical division of the parts in the procceds of tillage.

In general, the best and most effectual method of breaking down and bringing land into the rate of proper tillage, is by the use of the plough and different other implements of the harrow kind, such as those which have been noticed above, suited to the intention of the cultivator, and the peculiar nature of the land or soil. The tillage with the plough should consistently be performed according to the nature of the soil, and that of the crop which is to be sown or set, and the operations which are afterwards to be executed upon it. But to whatever depth this may be proper to be done, it is of much consequence to have it performed in an exact and effectual manner; as on this not unfrequently depends the difference between a good and bad crop, as well as that between the animals employed in the labour moving with ease and with difficulty. The repetitions in the tillage of this sort must be constantly regulated by the quality and circumstances of the land and the designs of the farmer, as some sorts and cafes of land require much more tillage than others. This point is most decidedly evinced in the Agricultural Survey of the County of Gloucester. On the Cotswolds, it is the practice, the writer remarks, to sow their crops one ploughing, experience having proved that frequent ploughings or tillage on these light soils, weaken the plaster of the land, and are productive of injury.

On the strong lands or soils of the county of Essex, the most intelligent and successful practical farmers, it is said, are those who are the most careful in the repetition of tillage of the plough kind, to which they constantly attribute great powers and effects. The strong heavy lands have it eight or more times in many cafes, even for barley or oats; and on those which are light, the general system of tillage is mostly four or five times for the different fallow crops. In this last intention, it is not unusual to commence the first tillage ploughing towards November, continuing it nearly or quite to the end of March, after barley sowing; and if at the first period of such tillage the ridges be laid a little round, so as to be water-flows and, after that well water furrowed, the tillage is greatly promoted. The land is mostly first

Vol. XXXV.
TILLAGE.

first broken up into ridges of eight or twelve nine-inch furrows; then crossed, and the ridge given in different ways very often during the former season, carefully turning up and exposing every time a different surface, as much as possible, to the sun and air: before harvest it is got up on four-furrow ridges, when, after that season is over, it has again immediately another tillage ploughing; and if the weather be suitable, it is done twice, leaving it upon the ridge for the ensuing winter; the latter the last tillage furrow is given the better, in this district, for preventing the black graps-weed getting up; after which the whole is well water-furrowed for taking off any water that may be upon it: by these means the land is much earlier got upon in the spring season than could otherwise be done, and in confequence, when the tillage for barley is performed, such stiff tenacious lands break down into the finest tith it is almost possible to conceive.

In executing the work of tillage on ridges for wheat, or any other sort of crop, great attention is here bestowed on turning the furrows well, drawing them straight, making them alike in size, and lapping them with such regularity on to each other, that the harrow tools cannot fail to lay hold of them all with facility; the flutting-up furrow more especially is drawn with perfect straightness, exactly turned, swept out with cleeves, and at the same time the space between the ridges kept in too wide a flane.

But notwithstanding this great and frequent tillage, in some places they do not venture in the seed on the autumnal furrow, but give a spring plough tillage, though perhaps some other tool of the tillage kind might answer better in many cases, and be far more expeditious.

The most proper and suitable depths of tillage for different sorts of soils, have probably not yet been well ascertained; but such as have a good strong staple, require much more deep tillage than those of the light kind. Whether flat-work tillage, as practised in Norfolk, or that of feathered, as employed in Essex, has the advantage, is not properly decided, but probably each may have a superiority on different sorts of land; the great point of importance is that of allowing the covering of the seed well.

The plan of tillage given below has been advised in the Corrected Agricultural Survey of the County of Salop, for the lighter sorts of friable lands, on a farm of four hundred acres: first, the wheat stubble is to be harrowed by drawing the harrows one way, which lays the stubble; and by returning back along the same stroke, they draw the greater part of that which was gathered by the harrows; and a proper person following them with a fork, unloads them, and lays the stubble in heaps, to be dispersed as directed below.

This stubble ground has the tillage of ploughing from the middle of November to the end of the following month; about the beginning of March it has that of cross-ploughing given it, and when dry, well harrowed; and when the weather is suitable, much of the couch-grafs is got out of it and burnt; but when not so, it is, in this way, checked in its growth during the seed-time, and the hufmefs is more easily performed; which is to be done in the month of May and the two succeeding ones, in which the fallow lands have the tillage of three ploughings and sufficient harrowings to prepare them for turnips, for which eight cubic yards of reduced dung, or seventy-two bushels of clover-lime, are laid upon the acre; which are ploughed in at the last tillage-furrow, though sooner, it is thought, would be better, if the dung be reduced enough by that time, or the land be so clean as not to require much harrowing. Turnip-feed, one pound to the acre, is then sown from the 7th of June to the 14th of the following month, the plant being twice hoed; the average produce is from 21 to 21. 15s.

As the same land becomes cleared of its crop of turnips, it has the tillage of ploughing and harrowing, preparatively for a crop of barley: and being again tilled, by being ploughed up in butts or lands five yards in width, from the latter end of March to the latter end of the following month, is sowed with three and a half statute bushels of barley, fourteen pounds of common red clover-feed, and one peck of fine rye-grafs-feed to each acre: the average produce is about forty bushels, of the statute kind, of barley to the acre.

The young clover which is not eaten between December and May, in the part which is mowed, on an average produces about two wagon-loads, or a ton and a half to the acre. In the succeeding month of October, it is ploughed in the tillage of nine-inch furrows and five inches deep, and sowed with two and a half bushels of wheat; the produce about seventeen bushels the acre.

The turnip-crop is generally dispofed of somewhat in this manner: first, by drawing home theoje under the hedges, at the beginning of November, and some of the largest over the rest of the field, taking all up where the hedges and carts are to pass. When the tops and small roots are cut off, they carry them home, and place them in heaps of about twelve cart-loads each, in the form of the cone of a wheat-rick, covering them a foot thick with straw and thatch. These serve as a resource in time of frost and snow, for the beasts that are stall-fed, of which there are generally twenty yearly; and a man and boy, with one horse and cart, supply them; leaving ultimately in the fields as many turnips to be eaten off upon the land by sheep, as to ensure fertility enough for the crops of barley, &c. as the barley, being too rank, commonly spoils the young clover growing with it. Another advantage in this plan of tillage, which is obtained by stall-feeding with turnips, is the making a large quantity of straw into manure at home; which is the best use that can be made of it, as straw-food is not an improver of cattle-rock.

This method of tillage or cultivation for dry lands, is recommended to those who have been in the practice or custom of long tillages, and without the ufe of general turning, to be continued for so long as two courses of tillage, that is, eight years; by which time their land will be clean, and more fit for what is conceived to be a more beneficial mode of husbandry, and which mode is now, it is said, pursued; namely, fifth turnips, managed and manured for as above; second, barley; third, pife; in rows one foot and a half, land-hoed, and weeded; fourth, barley, with ten pounds of common clover, four pounds of white Dutch clover-feed, two pounds of trefoil-feed, and one peck of fine rye-grafs-feed, eight cubic yards of rotten dung, or seventy-two bushels of stone-lime laid upon the young clover in November; fifth year, now or graze the land; the sixth, graze until October; and the seventh, give a plough tillage, and sow with wheat as before; the land muck'd for turnips, and lime or compost of lime, and earth or mud, &c. laid on the young clover in the autumn. This is believed to be a more profitable course of tillage, after land has been got into order, than that which was previously practised, affording a greater change, and thereby obviating the failure both of turnips and clover, and occasioning more grass-land, which for many years has there exceeded the tillage in point of profit.

As an improvement of wheat-lands, or mixed foils upon clay, the mode of tillage directed below is advised to be practised.
The turf or other land being well ploughed or tilled, and laid dry before Christmas, in the following month of April sow the land with four and a half statute bushels of oats, plough and lay it dry in the autumn, and in the month of May and the two following ones, give it three good tillage ploughings and harrowings, with some rollings, &c. so as to reduce it well; being thus drawn up and laid dry, it may continue in that state to the middle of September; though made both fine and clean, it sometimes gets such an adhesive and binding quality, and consequently works lumpy, and therefore has the texture and quality which the farmer, by milikake, is afraid of losing by making his land clean. It is, however, it is said, in the three above months, when the sun is powerful, that land is to be cleared of tillage: a ploughing in August is seldom of much worth.

If manured with lime, lay eighty bushels upon the acre; if with dung, ten cubical yards to each acre, either ploughed under at the July tillage ploughing, or before. From the 20th of September to the 10th of the succeeding month, sow wheat nine statute pecks to the acre, after having hoaked the fame not more than eight hours in mild brine, and dried it with lime, to prevent the blight. The next autumn plough the corn stubble, and at the end of March plant beans or peas in rows one foot asunder, hand-hoe and weed them. Plough in the autumn, and now oats in the spring, and lay down with ten pounds of red clover-feed, four pounds of white Dutch clover-feed, and one peck of rye-grafs-feed to each acre. Manure the land in seeds in the autumn, and let it lie in fward two or three years, as it may be required. At the next breaking up, plant the land with beans, hand-hoe and weed them; the ensiling autumn sow it with wheat, then with beans in rows, hand-hoe and weed that crop; then put in oats and lay down with feeds, as before. In lieu of one of the hoeing crops, if the land be not too wet, potatoes may be planted, which would be found very profitable to the wheat-land farmer; being very useful food for feeding or milking cows in the winter season. The farmer should follow for the first crop in one tillage, and hoe the next, and so proceed alternately; the summer fun to wheat lands being certainly useful, and also the manuring with dung or lime in an alternate manner. Where marle is to be procured at convenient distances, nothing turns to more profit upon open foils, with either clay or dry bottoms, marle laid upon the fward in the autumn, and to lie one year, is commonly the best practice, especially if the marle be not perfectly good. Lime is sure to pay well the next tillage course.

On this mode of tillage it is, however, remarked, that good farmers, on light soils, will entertain the plan here prescribed with some caution, and that their apprehensions of a crop of couch will often outweigh their hopes of a crop of clover. That peafe are precarious; one week's hot weather whilst in blow is often fatal to the crop.

It is added too, on the authority of Mr. Harries, after noticing the insufficiency of some fellow tillage lands, that there are many active farmers who begin the tillage on their fallows in January, and by repeated ploughings, harrowings, and rollings, bring them into very good order for wheat. Others graze the second year's clover until about the middle of the summer, and sometimes mow it at that time: if the soil be dry and the summer favourable, they bring it into very good tillage order by feed-time. It would, however, it is thought, be better tillage husbandry to raise a crop of turnips on such lands, after wheat or barley. If this was done, at least in every course of tillage, a good crop of wheat would be grown upon clover layers, upon one tillage ploughing, at a light expense. It is frequently his custom to break up his clover layers of the first or second year, if they are tolerably clean, upon one ploughing, putting upon the plough a cutting tool or instrument, which is there termed a fur or flay, that cuts or pares off the surface turf, and lays it in the bottom of the fward. Lately, a clover layer was worked with this instrument upon the plough, and after the feed was harrowed in, scarcely any of the surface turfy matter came upon the ploughed surface, the field looking as well, and appearing as clean, as though it had been fown upon fallow tillage.

Some, however, on hollow lands, do not approve of this skimming or paring tillage; as flicing the surface of such soils they consider much worse than turning it over in the ordinary manner, and letting the surface vegetable matters be laid into the furrows in a fort of diagonal position, though some of them should even appear out in the seams. The notion is notwithstanding probably erroneous, as such surface produce is always, in some way or other, to be rorted and got rid of, as in every mode of tillage it is ploughed in or under, and the main point is how to get the most speedily and completely quit of it, and to render it the most useful to the crop which is to be put in. These are certainly the belt and most fully accomplished by taking it wholly off by such a cutting apparatus, and placing it at the bottom of the furrows, which must also leave the hollowness of the land at the same time.

In the breaking-up tillage of old gras-lands, it must be executed in a manner suitable to the nature, state, and quality of the soil, whatever that may be, reducing and breaking the turfy fward well and carefully down, and clearing it effectually from defects and vermin of all forts by proper crops, such as those of the pea, bean, teasel, and other similar kinds, before the introduction of those of the grain fort. In this way, the lands will not only be the belt brought into a proper state of tillage, but the corn-crops the most effectually secured from the danger of worms, grubs, and other noxious vermin.

It has been remarked by the writer of the Corrected Agricultural Survey of the County of Norfolk, that for the last four or five-and-thirty years that he has examined West Norfolk with the eye of a farmer, the change in the tillage system, which has taken place in that vall arable diocrit, has not been great. At the early part of that period, the tillage course was, it is said, first, turnips; second, barley; third, grasses for two, or, in a few cases, three years; fourth, white corn: on the better foils, wheat; on others rye, &c. The only material change that has occurred, has been, it is thought, in the grasses: the variation, which, it is believed, first took place from forty to fifty years ago, was shortening the duration from three years to two; in both cases giving what may be called a fort of half-fallow the last year, by means of a half-ploughing, soon after the middle of the summer. Above thirty years ago, the writer, it is said, contended, both in print and in conversation, against it, but was held cheap for entertaining any doubts of the propriety of the practice. He has lived, however, it is observed, to see this change also in a great measure take place amongst the best farmers, who now give only one ploughing for the winter corn, whether wheat or tares; or in the spring for peas. That it is an improvement cannot be questioned, it is thought. The argument for it, founded on the invention of the drill-roller, and on the introduction of the drill-plough, is good, it is said, but not singular, as the practice of dibbling is like-wise far more adapted to a whole than to a broken furrow; and for broad-cast common sowing, if we are able to cover the feed by harrowing on stiff soils, once ploughed, it is evident the same practice might be better followed on sand. The

4 N 2
other reason for the former system, spear-grass getting a head in a layer, is quite inadmissible; it is thought; as he must entirely agree with Mr. Orman, a large tillage cultivator in that district, that no weeds, the feeds of which are not carried by the wind, will be found in a layer, if they were not for them.

It is contended likewise, that the variations which have taken place in the village crops put in upon layers, are neither great, nor are they peculiar to the above county; the principal one is that of raising peas on the flag, and then the wheat, and others. an admirable system, which, it is said, has long been practised by good farmers in Suffolk, and, it is believed, till earlier in Kent. That Mr. Purdie's mode of substituting tares holds on the same principle. Considering the very great size and value of white pease-straw, well got, as sheep food, which is no where better understood than in Kent, it is thought there is no tillage husbandry better adapted to a sheep-farm, than this of peas or tares preceding the wheat crop.

But it is thought that a very great and important change has taken place in the application of village crops to sheep instead of bullocks and cows. Formerly the farmers consumed much of their straw by cattle; now the best of them have it all trod into marnure. Sheep are the main grazing flock, and no more cattle kept than for treading, not eating straw while feeding on oil-cake and other such food. This has, it is contended, a very important change, which has had a considerable effect, and which has depended not a little on the introduction of South Down sheep. Yet, it is, as it were, the grand object in the whole tillage system, the singular readiness with which the farmers of West Norfolk have adhered to the well-grounded antipathy to the taking of two crops of white corn in succession: this is talked of elsewhere, it is said, but no where so steadfastly adhered to as in this district. It is this maxim, it is said, which has preserved the effect of their meal on thin-soiled lands of the wheat kind in such a manner, that the district continues highly productive, under an almost regularly increasing rent for more than sixty years, or three leaves of twenty-one years each; and by means of which great tracts have been made da fecond, and even a third time with much advantage. This tillage system, it is supposed, has been that to which the title of Norfolk husbandry has been long, and it now peculiarly appropriated; and by no means that of the management of the very rich district of East Norfolk, where the soil is naturally among the finest in the kingdom, and consequently where the merit of the farmer must be of an inferior stamp; barley there, it is said, very generally follows wheat; an incorrect tillage husbandry, detracting no praise, but condemnation. The celebrity of the county in general was not heard of, it is said, until the vast improvements of heaths, walks, sheep-walks, and warrens, by enclosure, and marling took place in consequence of the exertions of Mr. Allen, of Lyng-Heane, lord Townshend, and Mr. Morley, who were in the first thirty years of the preceding century. They were happily, it is said, imitated by many others; an excellent system of tillage management introduced, and such improvements wrought, that effates and lands which were heretofore too insignificant to be known, became objects of public attention in the capital. The fame of Norfolk, it is remarked, gradually expanded, and the husbandry of the county was celebrated before East Norfolk was heard of by beyond the conversation of Norwich and Yarmouth. It is, it was said, that without a continuance of constant tillage management and persevering exertions, West Norfolk would even again become the residence of poverty and rabbits. But let the meadows be improved; irrigation be practiced wherever it is applicable; the remaining wastes cultivated; and this district will, it is maintained, become a garden. Such are the utility and importance of good tillage and other systems in the cultivation and improvement of land.

In conclusion, it may be flated from the Corrected Agricultural Report of the County of Hereford, that the importance of the tillage farmer cannot be disputed; and yet that perhaps no branch of the art of husbandry is clogged with so many obstacles and impediments to its improvement and success. The advantages of the grazing system over that of tillage-cultivation, hold out a great inducement to the farmer to convert his tillage land into pasture, the immediate effect of which must be felt in the reduced quantity and increased price of grain of every description. And unfortunately, this is not the only obstacle or hindrance to the tillage farmer; the tax on horses used in agriculture operates also against the proper tillage culture of the ground. It was probably suppos'd, it is said, by the framers of this duty, that the number of horses would thus be diminished, and that of oxen increased; but it should be recollected that oxen, valuable as they sometimes are as auxiliaries, can never be made the substitute of horses for tillage; their constitution and habits will not admit of it; and the shoe with which they are occasionally furnished, affords but an imperfect protection to the foot on hard lands or stony roads. See Team.

No check, but every encouragement, should certainly be given to tillage, or the means of raising and providing the broad-corn for the increasing population of the country. See Supply and Compopulation.

TILLAGE Farm, that fort of farm which is, for the most part, cultivated under the arable or tillage system, or that by means of the plough. See Farm.

TILLANDSIA, in Botany, was so named by Linnaeus, in memory of an early Swedish botanist, Dr. Elias Till-lands, professor of physic at Abo, who died in 1692, aged 52, after having published in 1683 an octavo alphabetical catalogue, in Latin and Swedish, of the wild, as well as cultivated, plants of the neighbourhood of his residence. This little volume was accompanied, or soon followed, by another, containing a rude, but often expressive, wooden cuts, of 158 plants, mentioned in the foregoing catalogue. It is a defect in these cuts that they are not always original; an influence of which occurred to the writer of the present article, while preparing a critical dissertation on some British species of Hieracium, see Tr. of Linn. Soc. v. 9. p. 232. The Pilofella, t. 14. of Tillands proving a copy of Tabernemontus, rendered his work of no authority in an important point; though such a defect was not previously known, even to his learned countryman the late Mr. Dryander; and the book funk immediately in his effimation, except as a rarity.—A curious reason for the name of Tillandsia, as applied to the genus of which we are about to speak, is given by Linnaeus himself, in his Protectiones in Ordines Naturae Plantarum, published by Giseke, p. 291. "Tillandsia cannot bear water, and therefore I have given this name to the genus, from a professor at Abo, who in his youth having an unprofitable passage from Stockholm to that place, no sooner set his foot on shore, than he vowed never again to venture himself upon the sea. He changed his original name to Tillandsia, which means on, or by, land; and when he had subse- quently occasion to return to Sweden, he preferred a circuitous journey of 200 Swedish miles through Lapland, to avoid going eight miles by sea." This circumstance is also alluded to in the Tour in Lapland, published from the journal of Linnaeus in 1811, v. 1. 43. One of the most inviudious cenfor
TILLANDSIA.

Gen. Ch. Cal. Perianth inferior, of one leaf, oblong, erect, permanent, in three oblong-lanceolate, pointed segments. Cor. of one petal, tubular; tube long, inflated: limb small, erect, in three obtuse segments. Stam. Filaments fix, linear, inserted into the tube of the corolla, and of the same length; anthers acute, incumbent, in the throat of the tube. Pfr. German superior, oblong, tapering at each end; style thread-shaped, the length of the flaments; stigma three-cleft, obtuse. Peris. Capsule elongated, bluntly triangular, pointed, scarcely separated into more than one cell, of three valves. Seeds few, cylindrical, each supported on a long flake of aggregate fibres, forming a feathery wing.


1. T. tenuisulata. Bottle Tillandsia. Linn. Sp. Pl. 409. Willd. n. 1. Ait. n. 1. (Viseum carphylophoides maximum, flore tripetalacto pallido luteo, femine filamento; Sloane Jam. v. i. 188.)—Leaves linear, channelled, recurved; dilated and inflated at the base. Stem closely paned.—Found on the borders of large trees in Jamaica, where it is known by the name of Wild Pine. Sloane observes that the long, tough, smooth fibres of the root, which is perennial, do not infestate themselves into the bark or wood, to draw nourishment from thence, but merely grasp the branch, fixing themselves firmly to the bark for support. Stem solitary, round, smooth, leafy, three or four feet high. Leaves numerous, often a yard long, channelled, entire, tapering to a very tender point, recurved, striated; paler beneath, and clothed with extremely minute chaffy scales like powder; the radical ones greatly enlarged and tumid at the base, where they form a sort of oval hollow vessel, which holds a quantity of water, collected during the wet season, from the rain trickling down the channels of the leaves. In this it is said that small aquatic animals sometimes take refuge, while birds, and even men, are reported to have derived a welcome supply of drink. The water seems destined to support the plant during drought, when it would otherwise obtain nothing by its roots; but this tender stock is enough to preserve life, and indeed a considerable degree of luxuriance. The flowers are of a pale greenish-yellow, with purple anthers, and compose a close branched panicle. The long branching down which accompanies each flower, and is inserted into its base, carries it to a distance, and readily clings to the rough barks of trees, where the feel speedily vegetates. When the stem is wounded, a clear white mucilaginous gum exudes. Sloane.

2. T. serrata. Serrated Tillandsia. Linn. Sp. Pl. 409. Willd. n. 2. Ait. n. 2. (Caraguata elata et fiscata, folis serratis; Plum. Ic. 63. t. 75. f. 1.)—Leaves flat, smooth, with strong spinous serratures; entire towards the base. Spike compound. Bractees with spinous teeth.—Native of Jamaica. Brought to Kew, with the foregoing, by captain Bligh, in 1793. This is a large flower perennial plant, with the aspect of an Albeg, but not fo succulent. The leaves are two or three feet long, and two inches broad, their upper part especially bordered with hooked spines; their under side curiously and minutely dotted between the numerous fine ribs. Stem and compound spike befit with broad, ovate, pointed bractees, with spines are more direct and tooth-like; the under side ribbed and dotted in the manner of the leaves.

3. T. Engallata. Tongue-leaved Tillandsia. Linn. Sp. Pl. 409. Willd. n. 3. Ait. n. 3. Jacq. Amer. 92. t. 62. (Caraguata latifolia elavata; Plum. Ic. 63. t. 74. Viseum carphylophoides maximum, capitulis in fummetate conglomeratiss.; Sloane Jam. v. i. 189. t. 122.)—Leaves flat, somewhat tongue-shaped, smooth, entire, as well as the crowded bractees.—Native of old trees in the vault forest of Martinico, as well as of Jamaica, where it is said to flow water, like the first species. In size it agrees with the second, but the entire leaves, and the clothed leaf head or spike of flowers, abundantly distinguish that before us. Jacquin says the flowers are yellow, inodorous, three inches long.

4. T. tienuifolia. Slender-leaved Tillandsia. Linn. Sp. Pl. 410. Willd. n. 4. Swartz Ind. Occ. v. i. 591. (Renalmia fissa multiplici, angustifolia, flore cuneo; Plum. Ic. 234. t. 238. f. 2. Viseum carphylophoides minus, foliorum inus viridibus spicibus fabrubicundis, flore tripetale purpureo, femine filamento.; Sloane Jam. v. i. 192. t. 122. f. 1.)—Leaves linear-thread-shaped, channelled, erect, taper-pointed. Spikes alternate, imbricated. Flowers two-ranked.—Parasitical, like all the foregoing, on the branches of trees in the West Indies. The stem is a foot high, simple, entirely concealed by the broad leafbase of the leaves which clothe it. The radical leaves are very numerous, above a span long, very tender, resembling those of some long-leaved kinds of Pinus, but more tapering and channelled; moderately dilated, fleshy, downy and rufly, at the base. Those of the stem are much shorter, and almost fetaceous, though their base is still broader. Spike three or four, alternate, sufflo, imperfettly two-ranked, lanceolate, an inch long, proceeding from broad fleshy bractees. Flowers imbricated in two rows, blue. Linnæus quotes by mistake a synonym of Jacquin, belonging to the following.

5. T. flexuosa. Zigzag Tillandsia. Swartz Ind. Occ. 592. Willd. n. 5. Ait. n. 4. (T. tienuifolia; Jacq. Amer. 92. t. 63.)—Leaves linear-lanceolate, channelled, recurved. Spike lax, zigzag. Flowers two-ranked, dilant. —On trees near the sea in Jamaica, as well as near Carthage in South America. Extremely unlike the last. The leaves are very broad and concave in their lower part, consoled about the base of the stem, green, elegantly marked with broad, whitish, minutely scaly, transverse stripes; their points recurved in all directions. Stem twice as tall as the leaves, being two or three feet high, mostly subdivided in the upper part, inviolate with close red sheaths, and terminating in two or three long, lax, zigzag spikes, with triangular falks. Flowers about an inch or more in number. Calyx coloured, near an inch long. Corolla still longer, with reflexed segments, at first blue, then red, as we presume from Dr. Swartz's description and the analogy of T. flava hereafter described. Capsule long, of three cells, the valves black and shining on the inside.

6. T. feaece. Setaceous Tillandsia. Swartz Ind. Occ. 593. Willd. n. 6. —Leaves linear-thread-shaped, recurved, nearly smooth. Spike simple, with two-ranked imbricated bractees.—Found on trees in Jamaica. Stem a foot or more in height, round, nearly upright, clothed with alternate, broad, bristle-pointed bractees. Radical leaves nearly equal in length to the stem, numerous, fleshy at the base, greyish, rigid, somewhat mealy as it were, with very minute scales.
TILLANDSIA.

teces. Spike terminal, solitary, ovato-lanceolate. Flowers alternate. Moth like T. tenella, L. n. 4, but differing in its recurved leaves, and simple solitary spike.

7. T. paniculata. Equated Tillandsia. Linn. Sp. Pl. 418. Willd. n. 7. Lamarck v. 1. n. 6. (Renalmia ramosiflora, flavus variegatus et circinatis; Plum. Lc. 233. f. 135.)—Radical leaves very short, lanceolate. Stem panical, twice compound. Spikes erect. Segments of the corolla linear, spiral.—Native of South America. We know nothing of this species but from Plumier, whose figure represents numerous, crowded, erect, concave radical leaves, and a stem alternately branched from the very bottom, with two-ranked reclining branches, laden with ascending spikes. A copy, in our possession, of his original drawing shews the flowers to be four inches long.—We have no good authority for Browne's synonym, cited by authors, nor does it, if correct, throw any light upon this very obscure species. Lamarck informs us, from Plumier's manuscripts, that the stem is sometimes taller than a man; that the calyx is spotted with green and purple; corolla of a violet blue, dotted with purple, its long narrow segments becoming spiral as they expand. This is the circumstance to which Plumier's definition alludes. His greatly reduced plate is not sufficiently exact to explain it, and Linnaeus inaccurately copied folis for floribus, in which Willdenow, of course, follows him without the least enquiry.

8. T. falcifolia. Falcate Tillandsia. Swartz Ind. Occ. 586. Willd. n. 8.—'Leaves lanceolate-awl-shaped, erect, straight. Spikes lateral, two-ranked, imbricated.'—Found on trees in Jamaica, in thickets near the sea-shore. Stem one or two feet high, leafy, simple. Radical leaves broad, concave, and sheathing, at the base; lanceolate and tapering upward, very slightly recurved; downy externally; those of the stem shorter, somewhat imbricated, ovate, with long awl-shaped points. Spike alternate, lateral and terminal, two-edged, an inch broad, with imbricated ovate bracts, membranous at the margin. Flowers solitary. Capsule an inch long. Swartz. Lamarck's T. clavata, cited by Willdenow with a mark of doubt, belongs to T. mongolchaya, n. 11, as evidently appears from Plumier's synonym, the figure belonging to which these writers overlooked.


10. T. polyfchia. Many-Spiked Tillandsia. Linn. Sp. Pl. 410. Willd. n. 10. (Renalmia epica multipeti, floro albo; Plum. Gen. 37. albo as Linnaeus supposieb. R. alia, epica multipeti, anguifolia; ibid. 37. Viscum carpylophloides anguifolium, floribus carulis: Catebl. Carol. v. 2. 89. t. 89?)—'Stalk bearing imbricated lateral spikes.'—Native of South America. We can make out nothing further of this species, nor how Linnaeus came to a knowledge of it, there being no specimen in his herbarium. Swartz however appears to be acquainted with the plant; for his remarks under n. 13. and 14.

11. T. mongolchaya. Single-Spiked Tillandsia. Linn. Sp. Pl. 410. Willd. n. 11. (T. clavata; Lamarck Dict. v. 1. n. 4. Renalmia clavata, floribus niveis; Plum. Ic. 233. f. 238. f. 1. R. non ranofa squamata, et floribus niveis; Plum. Gen. 37.)—Leaves radical, linear, channelled, recurved; broad and sheathing at the base. Stem simple, clothed with imbricated scales. Spike simple. Bracteas ovate, concave. —Native of the West Indies. Plumier gathered it on old trees in Hisspaniola. The numerous radical leaves spread widely in every direction, being about a foot long, and two inches broad, so much recurved that their points touch the branch on which the plant is fixed. Stem from fifteen to eighteen inches high, erect, round, firm, quite simple, as well as its spike. Bracteas white, streaked or dotted with red. Corolla snow-white; its limb in three deep ovate segments.

12. T. pruinos. Frosted Broad-leaved Tillandsia. Swartz Ind. Occ. 594. Willd. n. 12.—Leaves lanceolate, taper-pointed, recurved, clothed with flaggy scales. Spike simple, with imbricated, pointed, downy bracteas.—Found on the arms and stems of aged trees in Jamaica, as well as in Brasil. Stem a foot or more in height, simple, leafy. Radical leaves a foot long, spreading variously, near an inch broad at the bottom, but soon contracted into a long taper point, flat, densely clothed all over with flaggy, torn, peltate, shinning scales, the marginal ones flat, imbricated, and much dilated; stem-leaves much shorter and narrower. Spike terminal, solitary, simple, an inch long, ovate. Bracteas ovate, bluntish, concave. Corolla blue, longer than the bracteas. Capsule oblong, triangular, smooth.

13. T. canescens. Hoary Tillandsia. Swartz Ind. Occ. 595. Willd. n. 13.—'Radical leaves linear, erect, hoary, as tall as the stems. Spikes about three, terminal.'—Native of Jamaica, on trees near the sea-shore. Perennial, about a foot high, with short, simple, curling, fibrous roots. Stem simple, leafy. Radical leaves imbricated, linear, rigid, whitish or hoary; with very broad, ovate, concave, tumid, membranous, sheathing bases; stem-leaves tapering, acute, with more lax sheaths. Spikes usually three, crowded at the top of the stem, sessile, ovate, acute, flatish. Bracteas two-ranked, imbricated, ovato-lanceolate, smooth. Corolla red, with long segments. Nearly related to T. polyfchia, but that species is taller, with recurved, zigzag, smooth leaves, and numerous, scattered, lanceolate spikes. Swartz.

14. T. anguifolia. Narrow and long-leaved Tillandsia. Swartz Ind. Occ. 596. Willd. n. 14.—'Leaves linear-lanceolate, nearly erect, smooth, taller than the stem. Spikes somewhat cluttered.'—Found on the trunks and branches of trees, in Jamaica and Hispaniola. Perennial. Stem two feet high, nearly upright, simple, leafy. Leaves all imbricated, broad and sheathing at the base, lanceolate, narrow towards the end, straight, striated; the sheaths of the radical ones broadest, and rather inflated. Spikes numerous, scattered, somewhat cluttered, alternate, separated by leafy sheaths, imperfectly imbricated, compressed, lanceolate, many-flowered, an inch and half long. Flowers two-ranked. Bracteas imbricated, equitant, ovate, pointed, keeled, striated, smooth. Capsules elongated, pointed, triangular, smooth, extending beyond the bracteas. This likewise is cautiously to be distinguished from T. polyfchia, by having more upright leaves, longer than the stem, and the spikes separated by leafy sheaths. Swartz. Nothing is mentioned respecting the colour of the flowers.

TILLANDSIA.

roves, by lady Ncalk, about the year 1799. The root is somewhat tuberous, with many tough smooth fibres. Stem about six inches high, surroun ded, and almost concealed, by the dense tuft of very numerous radical leaves, which are sometimes all cur ved to one side, five or six inches long, pale green, frosted, as if it were, with hoary scaly pubescence, thickset towards the base. Spike three inches long, simple, many-flowered, with beautiful large white bracteas, tinged and tipped with rose-colour; the lower ones ending in leafy points. Calyx of the colour of the bracteas, but hardly so long. Corolla with obtuse, emarginate, convolute segments, at first of a rich deep blue, but finally changing to a deep red. Capsule dark brown, an inch long. This is, no doubt, very different from T. monophylla, though Linnaeus's account of that species may be, as unjustly hinted in the Bot. Mag., incomplete. T. flbrida flowers in November. It is said to live and blossom when suspended by a thread in a warm room. Few plants are more elegant or singular.

16. T. recurvata. Recurved-leaved Tillandsia. Linn. Sp. Pl. 410. Willd. n. 15. Ait. n. 6. Pursh n. 1. Swartz Obs. 121. (Vifcum caryophylloides minus, folvis pruinae infar candicantibus, flore tripetalo purpureo, femine frailmento; Sloane Jam. v. l. 190. f. 121. f. 1.)—Leaves radical, awl-shaped, scaly, recurved. Stalks naked, two-flowered. Native of the trunks of old rotten trees, in Jamaica and the Braful, as well as in Florida and Georgia, growing in dense tufts. The flens are very short, clothed with crowded, spreading, recurved, sheathing leaves, two or three inches long, downy with minute hoary scales. Stalks terminal. foliary, four inches high, slender, round, naked and smooth, each bearing at the top two upright flowers, enveloped in a pair of sheathing, furrowed, dotted bracteas. Segments of the corolla blue, obtuse, scarcely extending beyond the calyx. Anthers yellow. Capsule an inch long, slender, brown and shining, enveloped in the pale segments of the permanent calyx, which are as long, and nearly as broad, as the valves. Sloane says it draws its nourishment from rain water, falling into the cavity made by the leaves.

17. T. uineoides. Long-moifs Tillandsia. Linn. Sp. Pl. 411. Willd. n. 16. Pursh n. 2. (Vifcum caryophylloides tenuefimum, e ramulis arborearum usculi in modum dendronum, folvis pruinae infar candicantibus, flore tripetalo, femine frailmento; Sloane Jam. v. l. 191. f. 122. f. 2, 3. Cuceuta ramis arborearum innoacent, &;c; Pluk. Phyt. l. 26. f. 5; also f. 6.)—Stem much branched, thread-shaped, twifted, minutely scaly, as well as the awl-shaped channelled leaves. Native of shady woods from Virginia to Florida, as also of the West Indies and the Braful, flowering in July. The long winged contorted flens creep over the flems and branches of old trees, and even along a rope or hair line, if put in their way, the roots scarcely fixing themselves, or deriving any sustenance, from either. The flens are, according to Mr. Pursh, of a yellowish-green. When the hoary flaggoy cost of the plant is separated by beating or rubbing, the remains of the flens look like a mass of curling black horse-hair, and serve, like that, to stuff mattresses, &e; In this denuded state the flems are represented, along with the perfect plant, by Sloane as well as Pluknet.

M. Poiret, in Lamarck Dict. v. 7. 666—673, has greatly enriched this genus, not only with all the species published by Dr. Swartz, and which we likewise have adopted, but also with ten bevides, adopted from the Flora Peruviana of Ruiz and Pavon. That our work may not be incomplete, we shall briefly mention thee in the order in which M. Poiret has arranged them, trusting to him for the references, which we have not the means of consulting. He introduces them all, except the last, between the angulifolias, our n. 14, and recurvata, n. 16.


19. T. maculata. Spotted-leaved Tillandsia. Poiret n. 10. Fl. Peruv. v. 3. 40. t. 257.—Leaves radical, lanceolate-fivefold-shaped, shining; revolute at the point. Panicle alternately branched. Spikes nearly simple, many-flowered. Native of rocks and trees, in the middle of the great forests of the Andes, flowering from July to September. The leaves are channelled, polished on both sides, covered with red or purplish spots. Every part of the plant is often red. Stems three feet high, simple, jointed, with an oval scale, or bractea, at each joint. Panicle terminal, eighteen inches long, red, composed of alternate, nearly simple, spikes, furnished with numerous, oval-lanceolate, pointed bracteas, reddish as well as the calyx. Corolla violet, small.

20. T. rubra. Red Tillandsia. Poiret n. 11. Fl. Peruv. v. 3. 40. t. 266.—Leaves radical, sword-shaped, somewhat pointed. Panicle simple, spikes undivided. Native of rocks in Peru, flowering in March and April. The leaves are about two feet long, spreading or recurved; of a shining green above; silverly white beneath. Stems foliary, erect, two or three feet high; clothed with sheathing scales below; terminating in a straight reddish panicle, composed of many simple, alternate, oblong, lanceolate, divaricating spikes. Bracteas red, pointed, keeled, an inch in length. Flowers imbricated, seilloe. Calyx yellowish-red. Corolla small, violet, with reflexed segments.


Leaves solitary, in Peru, flowering in Jan. and July. The perennial root throws out many prostrate leafy joints. Leaves spreading, fix to nine inches long, with eight. Spike solitary, a foot high, simple, clothed with long-rolled leaflets. Panicled rosy-coloured, of from five to nine alternate leaflets, with oval, concave, white bracteas. Flowers sessile, with rose-coloured bracteas and calyx. Corolla white, with a white tube. Capsule purplish; deep purple within.

24. T. hypophtla. Seven-flowered Tillandia. Fl. Peruv. v. 3. 21. (T. hypophtha; Poiret. n. 15.)—Leaves radical, sword-shaped, tapering, very acute. Spike solitary, simple, of about seven flowers. Native of rocks and trees, among precipices, in Peru, flowering from June to August. Leaves, falcate, and rather downy. Stem near a foot high, quite simple, fealy. Flowers sessile, in two ranks, with lanceolate violet-coloured bracteas. Petals white, tipped with violet. We presume that M. Poiret has erred in his specific name.


26. T. capillaris. Capillary Tillandia. Poiret n. 17. Fl. Peruv. v. 3. 12. t. 271. f. C. —Leaves linear-awn-shaped. Stem forked. Stalks axillary, mostly single-flowered, capillary, smooth, thrice, as long as the leaves. On rocks, walls, and trees, in Peru, flowering in November and December. This species is said to be related in many respects to the T. recurvata, n. 16, but differs in having forked stems; more numerous and broader leaves, contracted at their base, and not recurved; capillary flowers; and solitary bracteas to each flower. (We would observe that the last character is found in the recurvata.) The plant forms dense, leafy, whitish, tufts, the leaves being clothed with very minute mealy scales. Stems about six inches high, forked several times, furnished with two-ranked, crowded, imbricated, reflexed, linear-awn-shaped leaves, striated at their base, and half clasping the stem. Stalks straight, bearing one or two flowers, with a solitary, ribbed, smooth bractea, and a leaf at their base. Calyx scarious, dark violet. Corolla white, hardly longer than the calyx. Anthers yellow. Capsule linear, twice the length of the calyx, dark violet within.


TILLANJONG, in Geography, one of the Nicobar islands, in the Indian sea. N. lat. 8° 31'. E. long. 94° 9'.

TILLE, A, a river of France, which runs into the Saône, about 3 miles below Autunne.

Tille, a town of France, in the department of the Oise; 3 miles of Beauvais.

TILIEE, a town of Bengal; 28 miles N.W. of Dacca.

TILLEMANS, Peter, in Biography, was born at Antwerp in 1684, and visited England in 1708, where he attracted attention by his excellent copies from the pictures of Bourgognone and Teniers, of whose works he preferred the freedom and spirit. He also painted landscapes with small figures, views of gentlemen's seats, sea-ports, &c., and met with very considerable employment. The duke of Devonshire favoured him, and for him he painted a picture of Chatsworth, which gained him considerable eclat. He died here in 1744.

TILLEMONT, Louis Sébastien le Nain de, a French ecclesiastical writer, was born at Paris in 1637; and in the school of the Port-Royal, into which he was admitted at the age of ten, he discovered promising talents and a pious disposition. From early life he devoted himself to the study of ecclesiastical antiquity, and made collections, principally relating to the first six centuries, with a view of composing a history of the church. Model and diffident, as well as learned, he deferred taking prelates' orders till his 40th year; and having done this, he declined all preferment, and retired first to Port-Royal-des-Champs, and then to Tillemont, near Vincennes, prosecuting his literary labours, and keeping in view his main object: he subject himself at the same time to very rigid penitentiary discipline. His austerity and intense application debilitated his constitution to such a degree, that he died in 1698, at the age of 61 years.

The plan of his great work comprehended two parts, viz. the secular and the ecclesiastical history of the period of which he professed to treat. Accordingly the first part, entitled "Memoires pour servir à l'Histoire Ecclesiastique des six premiers Siecles," was comprised in 16 vols. 4to. of which four volumes were published in his life-time, and twelve more after his death. The other part, entitled "L'Histoire des Empereurs et des autres Princes qui ont regne durant les six premiers Siecles de l'Eglise," consists of 6 vols. 4to. the last being left in MS. and not published till 1758, being published with the emperor Antonius. Dupin, though he disapproves the method of Tillemont, observes, that great instruction may be derived from his history, especially with respect to critical and chronological matters. His style merits no commendation. Gibbon, who often quotes his History of the Emperors, and praises his scrupulous accuracy, finds frequent occasion to confine his bigotry, and remarks, that "he never dismisses a virtuous emperor without pronouncing his damnation." Moreti, Gen. Biog.

TILLENENSEE, in Geography, a lake of Prussia, 8 miles W. of Luck.

TILLER, or Tallar, in Husbandry, a little young tree, left to grow till it be fallable.

Tiller is also a term used by farmers to signify, that the produce of the grain branches out into several flakes; in which sense it denotes the same thing with the Latin word fruitare.

It has been suggested by the writer of the "Elements of Agricultural Chemistry," that in the tillering of corn, that is, the production of new flasks round the original plume, there is every reason to believe that oxygen must be absorbed; for the flake at which the tillering takes place, always contains sugar, and the roots arise from a part which is deprived of light. The drill-husbandry is therefore supposed to favour this process; as loofe earth is thrown by the hoeing round the flake; and they are preserved from light, and yet supplied with oxygen. The writer has counted from forty to one hundred and twenty flakes produced from a grain of wheat, in a moderately good crop of the drilled kind. And we are informed, it is said, by Sir Kenelm Digby, in 1669, that there was
in the possession of the fathers of the Christian doctrine at Paris, a plant of barley, which they, at that time, kept by them as a curiosity, and which consisted of two hundred and forty-nine stalks springing from one root, or grain; and in which they counted above eighteen thousand grains, or fards of barley.

It is noticed, too, that the great increase which takes place in the transplantation of wheat, depends upon the circumstance, that each layer thrown out in tillering may be removed, and treated as a distinct plant.

The following statement is given in the fifty-eighth volume of the Philosophical Transactions, at p. 103: Mr. C. Miller of Cambridge, sowed some wheat on the 2d of June, 1706; and on the 8th of August, a plant was taken and separated into eighteen parts, and replanted; these plants were again taken up, and divided in the months of September and October, and planted out separately to fland the winter, which division produced sixty-seven plants. They were again taken up in March and April, and produced five hundred plants: the number of ears thus formed from one grain of wheat was twenty-one thousand one hundred and nine, which gave three pecks and three-quarters of corn, that weighed 47 lbs. 7 oz.; and that were eliminated at five hundred and twenty-six thousand eight hundred and forty grains.

There is a number of facts and cases of the vast increase of grain crops by tillering, scattered through the writings on agriculture and husbandry, which clearly shew the great utility and importance of it in the raising of such crops.

TILLER of a Ship, a long piece of timber (which should be straight-grained and free from knots) fitted into the head of the rudder as a lever, to turn it from one side to the other, in order to steer the ship. This term, or bieb, is used for the handle of a boat's rudder.

TILLER-ROPE, a kind of tackle, communicating with the ship's fide, and usually composed of untailed rope-yarn for the purpose of traversing more readily through the blocks or pulleys; this tackle serves to guide and assist the operations of the tiller, and in all large vessels is wound about a wheel, which acts upon it with the powers of a crane or windlass.

TILLERING, in Agriculture. See Tiller.

TILLEWALL, in Geography, a town of Prussia, in Oberland; 5 miles N.E. of Eylau.

TILLIERES, a town of France, in the department of the Eure; 6 miles N.E. of Verneuil.

TILLING, a town of Sweden, in the province of Upland; 23 miles S.E. of Upsal.

TILLIUM, or TILLUM, in Ancient Geography, a town on the western coast of the island of Sardinia, between the promontory Gordionum and port Nymphaeus. Ptol.

TILLONGSCHOOL, or KATCHAUL, in Geography, one of the Nicobar islands, of a triangular form, about 36 miles in circumference. N. lat. 7° 58'. E. long. 93° 59'.

TILLOT, Le, a town of France, in the department of the Vosges; 12 miles S.E. of Plombieres.

TILLOTSON, John, in Biography, a celebrated English prelate, defended from an ancient family in Chezfield, was the son of Robert Tillotson, a clothier at Sowerby, in the parish of Halifax, Yorkshire, where he was born in the year 1630. Having been brought up in the principles of his father, who was a Calvinistic puritan, and discovering an inclination to literature, he was entered in his 17th year a pensioner of Clare-Hall, Cambridge. In 1651 he was elected fellow of his college, and took pupils, to whose moral and religious instruction he was duly attentive. At this time, he was in his sentiments Calvinistic, heard such preachers, and used extemporaneous prayer. His views of theology were enlarged soon after he left college in 1656, by the influence of Chillingworth's "Religion of Protestants." But retaining his attachment to the Presbyterian form of church government, he was received into the family of Edmund Prideaux, attorney general to the Protector, as chaplain and tutor to his son. He attended the Savoy conference in July 1661, and preached a sermon (the first which he preached) at their morning exercise in Cripplegate, in the month of September. Under the Act of Uniformity in 1662, to which he submitted, he became curate at Chevening, in Kent. In 1664 he married the daughter of Dr. French, canon of Christchurch, by a sister of Oliver Cromwell; and in 1665 he was appointed lecturer to the parish of St. Laurence Jewry. His reputation as a preacher was very considerably increased at this time by his printed sermon, "On the Wisdom of being religious." His controversy on popery commenced with the publication of his "Rule of Faith," in answer to a book written by a convert to the Roman church. The part he took in a scheme for comprehending dissenters under the establishment, evinced his respect for that description of Christians and Protestants. (See Comprehension.) In 1666 he took his degree of D.D., and in 1669 he was made a king's chaplain, and was presented to a prebend of Canterbury. When King Charles, in 1672, issued a declaration for liberty of conscience, with a view of favouring the Roman Catholics, the bishops took the alarm, and recommended to the clergy to preach against popery. The king was displeased, and Tillotson, at a meeting of the clergy convoked by the bishop of London, furnished the following apology for their conduct: "That since his majesty professed the Protestant religion, it would be an unprecedented thing that he should forbid his clergy to preach in defence of a faith which they believed, and which he declared to be his own." Soon after this he preached a sermon at Whitehall on the hazard of salvation in the church of Rome; and yet, offensive as this sermon must have been, he was advanced, in 1672, to the deanery of Canterbury, which was followed, in 1673, by a presentation to a prebend of St. Paul's. At this time he published Dr. Wilkins's "Principles of Natural Religion," with a recommendatory preface; and the author, who died in his house, committed to him the draft of his papers. A familiar truth was reposed in him by Dr. Barrow. His dread of popery induced him, in 1680, to preach before the king a sermon, afterwards published by the royal command, and entitled "The Protestant Religion vindicated from the Charge of Singularity and Novelty." In this sermon a paragraph was introduced which incurred the charge of intolerance. "I cannot think," says he, "till I be better informed, which I am always ready to be, that any pretence of conscience warrants any man that is not extraordinarily commissioned, as the apostles and first preachers of the gospel were, and cannot justify that commission by miracles, as they did, to afford the established religion of a nation, though it be false, and openly to draw men off from the profession of it, in contempt of the magistrate and the law. All that persens of a different religion can in such a case reasonably pretend to is, to enjoy the private liberty and exercise of their own conscience and religion, for which they
they ought to be very thankful, and to forbear the open making of profelytes to their own religion, (though they be never to fear that they are in the right,) till they have either an extraordinary commission from God to that purpose, or the providence of God make way for it by the permission of the magistrate." The king speedily told the preacher delivered the sermon, but a nobleman at the close of it said to him, "It is a pity your majesty was asleep, for we have had the rarest piece of Hobbbin that ever you heard in your life," to which Charles replied, "Oldshiff, then he shall print it," which was the cause of the order. The paragraph was unworthy of Dr. Tillotson, and gave very general offence, both to the established clergy and Presbyterians. Tillotson was an ardent promoter of the Bill of Exclusion, nor would he concur in the addrefs of the London clergy to the king on his declaration that he could not content to fuch a bill. In 1682 he took occasion to vindicate the character of Dr. Wilkins from the asperions of Anthony Wood, by a preface to a volume of sermons, which he published from the doctor's MSS. He was also the editor, in 1683, of Dr. Barrow's sermons, in 3 vols. fol. It has been regretted as an inconsistency in the character of Tillotson, that when in company with Burnet he attended the lord Ruffel preparatory to his execution, they should urge this martyr to liberty to acknowledge the absolute unlawsfulness of resistence, though they were soon after decided friends to the revolution. By a "Discourse against Transubstantiation," and another "Against Pur- gatory," he commenced a prolonged controversy with the Papists. In 1683 he avowed himself a warm advocate for tendering charitable relief to the French refugees, on the repeal of the edict of Nantes; and in reply to Dr. Beveridge, the prebendary of Canterbury, who objected to reading a brief for this purpose, as contrary to the rubric, he remonstrated, by saying, "Doctor, Doctor, charity is above rubrics." After the settlement of the prince of Orange at St. James's, he was instrumental in persuading the princes Anne, who consulted him, to acquiesce in giving up her claim to the crown during the life of William, in cafe of her father's dying before him. After the revolution, no obstacle remained to the full gratification of his desires of advancement, which, however, he professed to be very limited. In 1689 he was appointed clerk of the closet to the king, and permitted to exchange the deanship of Canterbury for that of St. Paul's. During archbishop San- croft's suppfension for refusing to take the oaths to the new government, Dr. Tillotson was appointed to execute the archiepiscopal jurifduction; and it was then determined that he should have possession of the see. His whole conduct at this time evinced his attachment to the principles of toleration and civil liberty; and he was active in his endeavours for promoting a comprehension, though they ultimately proved unsuccessful. He also failed in introducing a new book of Homilies; and in a sermon preached before the queen, against the absolute eternity of hell torments, he excited the refentment and opposition of the orthodox party. After some reluctance on his part, he was consecrated to the arch- bishopric of Canterbury in May 1691, and also in a little while sworn a member of the privy-council. From this time he became very obnoxious to the high-church zealots, who attacked him in a variety of ways. Among other charges against him, one was his attachment to Socinian principles, which seems to have had no other foundation than his rational defence of Christianity, and his friendship and intercourse with Locke, Limborch, and Le Clerc; and for repelling which, he caufed to be republished, in 1693, four of his sermons "On the Divinity and Incarnation of our Saviour." — "If this be Socinianism, for a man to inquire into the grounds and reafons of the Christian religion, and to endeavour to give a rational account of it," says he in one of his pofthumous sermons, alluding to this charge, and also to the character of Chillingworth, "I know no way but that all considerate inquisitive men, that are above fancy and enthusiasm, must be either Socinians or Atheists." Dr. Jortin, in reference to this unfounded accusation, observes, "Tillotson had made some conceptions concerning the Socinians, which never were, nor ever will be, forgiven him, and had broken an ancient and fundamental rule of theological controversy: 'Allow not an adversary to have either common sense, or common honesty.' " After an examination of bishop Burnet's exposition of the thirty-nine articles, which he lent him in MS., he concludes his eulogy on the bishop's prudence and ability with observing, "The account given of Athanafius's creed seems to be no- wise satisfactory; I wish we were well rid of it." The archbishop's affiduity and zeal in the duties of his exalted station were highly exemplary and laudable; and yet they were not sufficient to silence the clamours of his enemies. At length the period of his usefulness terminated, in consequence of a paralytic stroke, which feized him, November 1694, in the chapel of Whitehall, and which, on the fifth day, proved fatal, in the 56th year of his age. His funeral, at the church of St. Laurence Jewry, was attended by many peers of rank. He left a widow, but no children; and as he took no pains to accumulate property, his debts could not have been paid, if the king had not remitted his fift- fruits; and the copy-right of his sermons was the only pro- vision which he left for his widow, to which a peniion, feeled upon her by the crown, was added.

"The temper and character of Dr. Tillotson," says one of his biographers, "were intitled to every encomium. He was humble, open, and sincere, of kind and tender affection, extremely bountiful in his charities, and forgiving of injurie, in which last virtue he was severely tried. His public principles bore the stamp of his disposition; they were philanthropical, tolerant, and liberal; and if he retained some predilections for the sect in which he had been educated, the chief professional fault with which he has been charged, candour will make due allowance for the effect of early habit. In some points he was, perhaps, too compliant, and was led into some inconsistencies; but the times were difficult, and his intentions seem to have always pure. As a writer, he is principally remembered for his sermons, which have long maintained a place amongst the most popular compositions of that class in the English language. A folio volume, comprising his "Rule of Faith," and sermons, was printed in his lifetime; and after his death two more folio volumes of sermons were published by his chaplain, Dr. Barker. Abroad, as well as at home, his works have been held in high estimation. The character given of them by Le Clerc, in his "Bibliotheca Choisis," is as follows: "The archbishop's merit was beyond any commendation he could give. It consisted in the union of extraordinary clearness of head, great penetration, an exquisite talent of reasoning, a profound knowledge of genuine theology, solid piety, a moft singular perspicacity, and unaffected elegance of style; with every other quality that could be defined in a man of his order; and whereas compositions of this kind are commonly mere rhetorical and popular decla- nation, better to be heard from the pulpit than read in print, his are for the most part exact differentiations, capable of bearing the test of the most rigorous examination." Addison considered the sermons of Tillotson as a standard of purity of the English language. Dryden acknowledges,
that if he had any talent for English prose, it was derived from frequent perusal of Tillofon's writings. Mr. Melmoth, however, in his "Fitzpont's Letters," expresses a very different, and in our judgment a less just or to say the least, a less candid opinion. He speaks of "his words as frequently ill chosen, and almost always ill placed; his periods as tedious and unharmonious; and his metaphors as generally mean, and often ridiculous." Notwithstanding these reflections, Tillofon's sermons, though surpassed by the correctness and elegance of modern compositions in this department, and less perused than formerly, will not cease to be regarded as a valuable part of English literature.


TILLS, in Agriculture, a term signifying tares or vetches in many places, in both the northern and southern parts of the kingdom.

TILLURAH, in Geography, a town of Bengal; 21 miles E.N.E. of Purneiah.—Alfo, a town of Hindoostan, in Bahar; 22 miles S. of Patna. N. lat. 25° 14'. E. long. 85° 22'.

TILLY, a town of Canada, on the St. Laurence; 10 miles S.W. of Quebec.—Alfo, a town of France, in the department of the Meufe; 9 miles S. of Verdun.—Alfo, a town of France, in the department of the Eure; 9 miles S.E. of Grand Andelys.—Alfo, a town of France, in the department of the Sambre and Meufe; 6 miles W. of Gemblours.

TILLY la Campagne, a town of France, in the department of the Calvados; 4 miles S.S.E. of Caen.

TILLY Vrois, a town of France, in the department of the Calvados; 9 miles W. of Caen.

TILLY Land, in Agriculture, that part which is, for the most part, con skład and composed of materials of the till kind.

These kinds of land, in their original flates, are in general of a very barren and unproductive nature; but when they have been fully turned over by the plough or other means, well and effectually wrought and reduced by other proper tools, and their parts completely divided and exposed to the alternate action of different agents, such as the frost and thaw, of drought, dew, and rain, with the many other improving effects of the atmosphere which surround them; and withal limed, separated in their parts, and enriched by calcareous and other suitable manures and substan ces, they become, in various instances, of a far less strong and stubborn nature, and greatly more disposed to the raising of good and plentiful crops upon them. They are commonly much ameliorated and improved at first by growing beans, tares, and rape in succession with wheat and other suitable sorts of grain, having the green crops so managed as to fland as close, thick, and thorn ing, as possible on the land. See Land and Soil.

TILMUS, 71° 30', a term used by some of the medical writers to express the effect of a fort of delirium, in which people pulse the bed-clothes, or pick out threads from the sheets. This is usually esteemed a dangerous symptom.

TILNOR, in Geography, a town of Bengal; 60 miles N.N.W. of Midnapour.

TILO-GRAMMUM, Ouol, or Ongli, in Ancient Geography, a town of India, situated, according to Ptolemy, to the right of the moft western arm of the Ganges, about 23° lat.

TILOTAMA, a nymph celebrated for her beauty in the mythological and amatory poems of the Hindos. She appears to have been one of that numerous class of females, who, under the name of Upars, arose from the churred ocean, as described under our article Kurmanathara: a fable as prolific of poetical notions, and as often referred to, as any in the whole range of invention. The chief of these Upars, or water-nymphs, was Rhenba, of whom some mention is made under her name in this work. They are described in numerous Hindu poems with all the warmth and fancy that may be predicated of "youthful poets when they love;" and in terms too glowing for readers beyond the tropics. Under the name of another of these beautiful damsels, Mirnaka, we have said something of them. See also Uparsa.

The name of the elegant nymph, the subject of this article, occurs in an inscription on a copper-plate found in the Deccan, bearing date A.D. 1359. The inscription is given in the 9th volume of the Asiatic Researches, and records a grant for pious purposes. After much adulation of the mother of the royal donor, it is said that "by the charms of her graceful gait the obscure Tilotama."

TILOUTTAH, in Geography, a town of Hindoostan, in Bahar; 10 miles S.S.E. of Saferam. N. lat. 24° 48'. E. long. 84° 15'.

TILOX, in Ancient Geography, a promontory on the northern coast of the island of Corsica, between the mouth of the river Valerius and Cadiz Littus.

TILPHOSSAEUM, a small country of Greece, in Thessaly.

TILSIT, in Geography, a town of Prussia, in the Lithuanian department, large, rich, and commercial. It obtained the privileges of a city in the year 1552, though the castle is said to have been flanding so early as 1280. The river Menel, which runs along the N. side of the town, opens to it a very advantageous trade with Königsberg, in corn, linseed, butter, and other provisions. Tilsit, properly so called, consists of two long streets, of a proportionate breadth, which are called the German-street and the High-street, contiguous to which are the suburbs called the "Liberty." The number of houses in this city is about 600, and the inhabitants amount to 7000 souls. The ecclesiastical buildings are an evangelical or Lutheran German church, a Lithuanian church, and a Calvinist or reformed church. Without the town is a Lutheran chapel, and about an English mile from it a Roman Catholic chapel. The flat country about Tilsit, which is about 16 miles in length, and as many in breadth, is one of the most fertile spots in the whole kingdom: the inhabitants of it breed great numbers of horned cattle, and furnish not only Prussia, but likewise other provinces, with excellent butter and cheese; and the fisheries in this place are also considerable. The hordes are large and strong, but clumsy. Barley is almost the only grain grown in these parts, which afford little or no wood. The marsh-land is, in spring, exposed to inundations by the overflowing of the rivers, which often do great damage. In 1867, it was taken by the French; soon after which a peace was made between France, Russia, and Prussia, called the "Peace of Tilsit"; 50 miles N.E. of Königsberg. N. lat. 55° 8'. E. long. 23° 8'.

TILT. See Tournament.

TILT, in Rural Economy, a term signifying the arched or other covering of a cart, wagon, or other carriage.

The hoops for supporting the tilts in these cafes, may be fastened upon the fides of the carriage-frames, after being properly prepared and bent in a fort of half-circular manner, in several different ways, but the fastening by means of screws is probably the best, where they are to remain fixed.

TILT-BOAT, a boat covered with a tilt, i.e. a cloth, or tarpawing, sustained by bails or hoops over the stern, for the
the sheltering of passengers. Such are some of those which carry passengers between London and Gravesend.

The Tilt-Hammer is a large and heavy hammer, adapted to be put in rapid motion by the power of a water-wheel or steam-engine.

The tilt-hammer is distinguished from the lift-hammer, or forge-hammer, by the manner in which it is lifted up by the cogs of a wheel which is turned by the mill.

The forge-hammer is mounted on a centre of motion at the extremity of the haft or handle of the hammer opposite to the head of the hammer, and the cogs of the wheel operate beneath the helve near the head, to lift or toss up the hammer against a strong wooden spring called the rabbit, which is firmly fixed over the head of the hammer. This spring reflects the hammer down upon the anvil with greater force and smartness than the hammer would descend by the action of gravity alone. A lift forge-hammer is described under the article Iron. See Plate IV. Iron Manufacture.

The tilt-hammer is poised on pivots or a centre of motion, which is about the middle of the length of the helve, or sometimes at two-thirds from the head. The cogs of the wheel are made to act on the tail of the helve beyond the centre of motion, and they press down the end of the tail, and thus cause a correspondent elevation of the head of the hammer. Sometimes the spring is placed over the head of the hammer, the same as a lift-hammer; but more commonly, the tail of the hammer is made to strike against a fixed floor; and when the head of the hammer is thrown up suddenly, the momentum given to it causes the head to rise up after the tail strikes the floor, and thus bends the helve, which by its elasticity causes the head of the hammer to descend smartly upon the anvil.

The tilt-mills in the neighbourhood of Sheffield are very simple: they are worked by a small water-wheel, upon the axis of which is a wheel with a great number of cogs, fixed in its circumference. These successively depress the tail of the hammer, and raise its head: the hammer falls by its own weight, aided by the spring of the helve, upon the hot metal. The size of the water-wheel, and the number of cogs in the wheel, are adapted to produce from three hundred to four hundred strokes per minute.

This great number requires the water-wheel to move with a velocity which is inconsistent with the best mode of applying the fall of water, because it is well known that water, as well as any other heavy body, can only descend with a certain speed. If, therefore, the floats of the wheel are required to turn with a great rapidity, it is evident the proportion of work the wheel will perform, will be too small in proportion to the quantity of water expended. For this reason, it is found to be a great improvement in tilt-mills to add cog-wheels which will give the hammers a sufficient velocity, while the water-wheel turns at such a rate as is found to produce the greatest power from a given quantity of water.

A capital mill of this kind is delineated in Plate VIII. Iron Manufacture. It was made at the Carron iron-works in Scotland, after designs of the celebrated Mr. Smeaton. It is adapted for forging iron into bars, and has three tilt-hammers of different powers for different kinds of work. These hammers are not made to strike so quick as is usual in the Sheffield mills for the tilting and drawing out steel bars; but by giving a greater number of cogs to the wheels, the requisite rapidity may be obtained without increasing the speed of the water-wheel. A capital mill was built at Sheffield about six years ago, which is on Mr. Smeaton's plan, except in the proportions of the wheels, and its performance is superior to any of the other tilt-mills.

A A, in the plan fig. 1. are the walls of the building; B B the great water-wheel, which is of the kind called a breast-wheel. (See Water-Wheel.) It is 18 feet diameter and 5 feet broad. The total descent of the water which actuates it is 7 feet 2 inches, and it falls upon the float-boards rather below the centre of the wheel, being retained against the floats by what is called the breasting, that is, a sweep or curved wall of masonry, which is accurately adapted to the float-boards of the wheel, and as close to them as is possible, to avoid touching.

The axis C of the water-wheel is carried through the wall A, and on the extreme end of it is a large iron wheel D, of 90 wooden teeth, 9 feet 6 inches diameter. This turns a pinion E of 30 teeth, and 3 feet 2 inches diameter. The pinion is fixed on one end of a cast-iron axis G G, which is made very large, for strength, and hollow within, like a pipe. The gudgeons b and c are fixed into it at each end, and upon these gudgeons it revolves. F F is a cast-iron fly-wheel, fixed on the axis close to the pinion; it is 12 feet diameter, and the rim 6 inches by 5. The weight is very considerable, and gives it a momentum to regulate the motion of the whole mill, and equalize all irregularities which arise from the successive actions of the mill to raise the three hammers, L M, and N.

Each hammer has a separate cog-wheel, K K, and H H, to give it motion, which is effected by the cogs of these wheels acting upon the tails of the hammers and prepping them down. This is explained by the elevation fig. 2. where c is the iron head of the hammer, f its centre of motion, and d the tail or extreme end, upon which the cogs of the wheel act, and which is plated with iron on the upper side, to prevent it from wearing.

P is the anvil-block, which must be placed on a very firm foundation, to resist the incessant shocks to which it is subjected: the centre, f s or axis of the hammer, is supported in a cast-iron frame, g h, called the hirth. When the cogs of the wheel strike the tail of the hammer suddenly down, and raise the head, the lower side of the tail of the hammer strikes upon a support n, which acts to stop the ascent of the head of the hammer c, when it arrives at the desired height; but as the hammer is thrown up with a considerable velocity as well as force, the effort of the head c to continue its motion, after the tail strikes the stop n, acts to bend the helve L of the hammer, and the elasticity of the helve recoils the hammer down upon the anvil with a re-doubled force and velocity to that which it would acquire from the action of gravity alone.

To obtain this action of recoil, the hirth g h must be held down as firmly as possible; and for this purpose, four strong iron bolts are carried down from the four angles of the bottom plate h, and made fast to the solid basis of stone R S, upon which the whole rests: upon these bases are placed four layers of timbers, i i, l m, which are laid one upon another, and the timbers of each layer are laid crossways over the others. Each layer consists of several pieces laid side by side, and they are slightly treenailed together; to form a platform. Each platform is rather less than that upon which it rests, so as to form a pillar of solid timber; on the top of which the hirth-frame g h is placed, and firmly held down by the four bolts, which descend through all the platforms, and have secure fastenings in the solid masonry beneath.

The float n is supported by a similar pillar, but smaller, and composed of three layers: the upper piece n, which is seen crossways in fig. 2 is about three feet long, and the under side is hollowed, so that the piece bears only upon the two ends, leaving a vacancy beneath it, which occasions it
TIL

it to bend or spring every time the tail of the hammer strikes upon it, and this aids the recoiling action very much.

The axis on which the hammer moves is formed by a ring of cast-iron, through which the whole of the hammer is put, and held fast by wedging round it. The ring has a projecting trunnion on each side, ending in an obtrude conical point, which is received in a socket firmly fixed in the hilt-frame g b by screws and wedges, one of which is seen at r. These two sockets are thus capable of adjustment, so as to make the hammer face fall flat upon the anvil. The three wheels K, I, H, are of different sizes and numbers of cogs to produce that velocity in each hammer which is best adapted for the work it is to perform; thus, the wheel K for the great hammer has eight cogs, and therefore produces eight blows of the hammer for each revolution of the fly-wheel; the wheel I for the middle hammer has twelve cogs; and the wheel H for the small hammer sixteen; the latter will therefore make two strokes for every one of the great hammer. In fixing the three wheels upon the great shaft G H, care is taken that they shall produce the blows of the different hammers in a regular succession, and equalize as much as possible the force which the water-wheel must exert. The wheels are fixed upon the shaft by means of a wedging of hard wood, driven in all round; the wood, being capable of yielding a little to the shocks occasioned by the cogs meeting the tails of the hammers, renders the concussions less violent.

The following are the principal dimensions:
The head of the great hammer, P, weighs 34 cwt., and it is intended to make 150 blows per minute; it is lifted 17 inches from the anvil at every blow.
The middle hammer, M, is 2 cwt., and makes 225 blows per minute; it is lifted 14 inches each time.
The small hammer, N, weighs 1 cwt., and makes 300 blows per minute; it is lifted only 12 inches.

To produce these velocities, the great axis G must make 182 turns per minute; and the cog-wheels E and D, being in the proportion of one to three, the water-wheel must make 63 revolutions per minute; the water-wheel being 18 feet diameter, its circumference will be $18 \times 3.1416 = 56.54$, or 56 feet: this multiplied by 6.25 is about 353 feet motion per minute, or divided by 60 = 5.9 feet motion per second for the circumference of the water-wheel.

The tilt-mills employed in the manufacture of steel, do not have the great hammer P, but the largest they use is about the size of that at M, and is adapted for welding faggots of steel to make hearth steel: the other two hammers are about the size of N, and are made to work much quicker, viz. from 350 to 400 blows per minute. This is very safely accomplished by making the wheels E and F as 1 to 4, instead of 1 to 3, as shown in the drawing.

TILTH, in Agriculture, a term used to signify the condition of the earth or soil after the land has been ploughed and broken down by the harrow or other tool of the same kind; or the state and circumstances of the ground in regard to tillage, or heart, as relating to manure. Thus we have a good and bad tilth, as well as land in and out of tilth, in works on agriculture.

TILTIL, in Geography, a town of Chili; 30 miles S.E. of Valparaiso.

TILTING of Steel, the process by which bliftered steel, or steel in the raw state, is rendered ductile and fit for the purposes of various manufactures. Tilting consists in hammering or forging the steel by a large hammer called a tilt. See Tilt-Hammer.

Steel is formed by two processes; one in which it is made at once from pig or crude iron in the finery, nearly in the same manner as making bar-iron: this is called natural steel. In the second process, malleable iron, in bars, is embedded in charcoal or other carbonaceous matter, and exposed to a considerable heat, till the iron is thought to have penetrated sufficiently into the iron to have changed it into steel. This is called converting the iron by cementation with charcoal; and the furnace in which the operation is performed is called a converting furnace.

The object of this process of cementation, is to impregnate the iron with a certain quantity of carbon, to be derived from the charcoal: like many other simple operations, it requires great care and nicety to perform it properly, when put in practice on a large scale. The iron must be exposed to the action of a intense heat in contact with carbon (but defended from the access of oxygen), until the iron imbibes a portion of carbon and becomes steel.

The quantity of carbon which must be combined with iron to produce steel, admits of considerable latitude, and the qualities of the steel vary in the same proportion: with too little carbon, steel will be soft; and not sufficiently hard when it has been suddenly cooled by plunging in water. It has a rough and somewhat fibrous fracture, and in general may be said to possess many of the qualities of malleable iron. On the other hand, in proportion as the quantity of carbon is diminished, an over-cemented steel, containing an excess of carbon, is brittle, easily fusible, excessively hard after being suddenly cooled, and is liable to crack on the sudden change of temperature iron hot to cold.

All these properties are an approach to crude iron.

The received opinion respecting steel and the best cast-iron is, that they have the same constituent parts, but in different proportions; the former containing a smaller proportion of carbon than the latter. All the crude or cast-iron of commerce contains oxygen in greater or less proportion, but the best steel is supposed to be nearly free from this. Mr. David Muirhead, whose great practical and theoretical knowledge entitles his opinion to the greatest respect, supposes that the carbon contained in cast-iron and in steel, exists in very different states; and that steel is a combination of iron with pure carbon, similar to the diamond, but that crude iron, is iron containing the oxyd of carbon, which is charcoal. This opinion is founded upon the result of a very numerous series of experiments, many of which he communicated to the Philosophical Magazine, vol. xiii. He found that a piece of Swedish bar-iron, weighing 885 grains, introduced into a Stourbridge clay crucible, and half its weight, (442 grains) of charcoal well prepared; a clay cover, fitting exactly, being placed on, and the whole exposed to a moderate heat for half an hour; that the result was, a perfect button of super-carbonated crude iron, weighing 928 grains, which therefore had gained 44 per cent. on its original weight; while the charcoal, which remained in the crucible, in an intensely black state, weighed 290 grains, having lost 34.4 per cent. of its original weight.

In a second experiment, made in a similar manner, but with only a quarter of the charcoal, the iron gained $\frac{1}{19}$ of its original weight, and the loss in charcoal was 45 per cent.; the metal was richly carbonated. When one-sixth of charcoal was used, the iron produced, resembled the produce of Nos. 1. and 2. of the crude iron of commerce; its weight was increased $\frac{1}{20}$; and 57 per cent. of the charcoal disappeared in the process.

With one-eighth of charcoal, the iron gained $\frac{1}{22}$ of its original weight.
original weight; and the weight of the charcoal which disappeared was 67.5\% per cent. The metallic button was very highly carbonated, and apparently formed an entire mass of carburet.

One-ninth of charcoal produced a super-carbonated button of crude iron, rather inferior to the preceding in point of carbonization: its surface was smooth, and of a dull lead-colour, entirely free from the usual shining specks of carburet, which very rich crude iron contains upon its surface. It had gained equal to \(\frac{1}{9}\)th in weight by the fusion; and the loss in charcoal was 80 per cent.

When treated in the same manner with \(\frac{1}{9}\)th of its weight of charcoal, the iron gained weight equal to \(\frac{1}{9}\)th parts; and 84.5 per cent. of the charcoal disappeared in the process. The metallic button possessed an uniformly smooth surface, partially covered with carburet.

One-fifteenth part of charcoal, exposed to a heat sufficient to melt it, was all lost; the metal gained \(\frac{1}{15}\)th in weight, which was exactly half the weight of charcoal lost. The surface of the button was not carbonated, as the foregoing experiments: the colour was bluish-black, smooth in the centre, but a little oxidized towards the edges. The fracture was that of close dark-grey crude iron; the crystals much closer and more minute than in the preceding experiments. Its quality was such as manufacturers term No. 2. grey melting pig-iron.

When only \(\frac{1}{15}\)th part of charcoal was employed, none of which remained after the fusion, the iron gained \(\frac{1}{15}\) parts in weight; a small portion of amber-coloured glass was found round the edges of the button. The fracture of the metal was smooth silver-white, occasionally furred with carbonaceous specks in form of small grains: it exactly resembled mottled pig-iron.

With \(\frac{1}{15}\)th part of charcoal, the metal gained \(\frac{1}{15}\) parts in weight, the whole of the charcoal disappearing. The upper surface of the button was smooth, but the under considerably pitted. The concaves were checked with the rude crystallization peculiar to cast-iron. Its fracture was bright silver-white, destitute of grain, and exhibiting a very perfect streaky crystallization glistening radiated: its resemblance was strikingly similar to that of highly-blown crude iron, prepared in the foundry for making malleable iron.

A piece of Swedish iron was placed in \(\frac{1}{15}\)th its weight of charcoal; the fusion of the mixture produced a metallic button weighing \(\frac{17}{15}\) parts more than the iron employed, which increase is not quite a quarter of the loss in charcoal, which wholly disappeared in the experiment. The upper surface of the button was smooth without configuration, but the under surface was uneven, and covered with minute but perfect crystallization: its fracture was blueish silver-white, composed of flat dazzling crystals, proceeding in lines from a centre to the edges of the button. Here it was evident, that from the small proportion of carbon combined with the iron, it was found to assume the earliest stage of granulation approaching to the state of steel. The brilliant concretions observable in the surface of the button were too indistinguishable for steel capable of bearing the hammer.

When the proportion of the charcoal was reduced to \(\frac{1}{15}\)th of the iron, its consequent increase was but \(\frac{1}{15}\)th part. The upper surface of the button was smooth, with a faint impression of a chequered crystallization: the under surface possessed some large pits similarly though more perfectly crystallized: the fracture was one shade of blue beyond the last experiment. A regular granulated surface, composed of flat oblong crystals, was observable, still too indistinguishable and too much on edge for workable steel.

With only \(\frac{1}{15}\)th of the weight of charcoal, the button was deficient \(\frac{1}{15}\)th part of its weight originally used, yet the whole of the charcoal was lost. The surfaces of this button were uniformly smooth; the fracture dense, and displaying a grain peculiar to highly carbonated blistered steel. When put under the hammer with a low red heat, it withstood a few blows, but afterwards parted.

Charcoal \(\frac{1}{12}\): the metallic button weighed \(\frac{1}{31}\) less than the iron employed. Its surface was wavy and crystallized: the under surface was rough, and contained one large pit accurately crystallized: the fracture was regularly granulated, small but distinct, and of a light blueish colour. The crystals, though distinct, were not so prominent as those of easy drawing cast-steel; it however burned with the usual degree of caution necessary in the working of cast-steel. The bar of steel formed from the button was very proper for file-making, and other purposes requiring highly converted steel.

The proportion was reduced to \(\frac{1}{12}\)th part the weight of iron; the produce was \(\frac{1}{22}\) less than the original weight of iron. The surface of the button was smooth, without crystallization: the under surface rough, and presented one large pit in the centre, faintly marked with the usual crystalline appearance. The fracture presented regular light-blue grains, distinct and more prominent than in the last experiment. One half of this button was drawn into a neat square bar, and proved excellent steel. One end of it, being loose and shelled, welded tolerably well, and hardened afterwards with a low heat. From its quality, it seemed adapted for manufacturing penknives, razors, &c. poffessing neither the extremes of hardness nor softness.

Mr. Mitheu continued this series of experiments till the proportion of charcoal became so small as \(\frac{1}{15}\)th part; and he gives the following conclusions, deduced from the results.

<table>
<thead>
<tr>
<th>Parts by Weight.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iron femi-steelified</td>
</tr>
<tr>
<td>Soft cast-steel, capable of welding, with</td>
</tr>
<tr>
<td>Cast-steel for common purposes, with</td>
</tr>
<tr>
<td>Cast-steel requiring more hardness, with</td>
</tr>
<tr>
<td>Steel capable of flanging a few blows, but quite unfit for drawing,</td>
</tr>
<tr>
<td>The first approach to a feebly granulated fracture, is from</td>
</tr>
<tr>
<td>White cast-iron</td>
</tr>
<tr>
<td>Mottled crude iron</td>
</tr>
<tr>
<td>Carbonated crude iron</td>
</tr>
<tr>
<td>Super-carbonated crude iron</td>
</tr>
</tbody>
</table>

In the above experiments it will be seen, that when more than \(\frac{1}{15}\)th part of charcoal is employed, the weight of the produce is increased; but when less than \(\frac{1}{15}\)th part is used, a loss is experienced proportional to the diminution of the carbon. The increase of weight of the iron is by no means equal to the loss in the charcoal, never exceeding the half thereof; but this is accounted for in other experiments made by Mr. Mitheu, where charcoal was found to be transmitted through close crucibles in a high degree of heat.

The French chemists made a direct experiment to prove that the diamond is really carbon in a crystallized state. By inclining a small diamond in a piece of malleable iron, and melting this in a close crucible, it was found to be converted into steel, and the diamond had disappeared.

The manufacture of natural steel is carried on in Germany, and Swedenborgius gives us the following account of the method used in Dalecarlia for making steel from cast-iron.

The
The ore from which the crude iron to be converted into steel is obtained, is of a good kind; it is black, friable, and composed of many small grains: it produces very tough iron. The conversion into steel is made upon a forge-hearth, something smaller than that commonly used for converting cast-iron into malleable iron: the sides and bottom are made of cast-iron; the tuerie is placed with little inclination on one of the side-plates; the breadth of the fire-place is fourteen inches, its length is greater: the lower part of the tuerie is six inches and a half above the bottom: in the interior part of the fire-place, there is an oblong opening for the flowing of the superfluous scoria.

The workmen first put scoria on the bottom, then charcoal and powder of charcoal, and upon these the cast-iron, run or cut into small pieces. They cover the iron with more charcoal, and excite the fire. When the pieces of iron are of a red white, and before they begin to melt, they flop the bellows, and carry the mafs under a large hammer, where they break it into pieces of three or four pounds each: the pieces are again brought to the hearth, and laid within reach of the workman, who plungs some of them into the fire and covers them with coal. The bellows are made to blow slowly till the iron is liquefied, when the fire is increased; and when the fusion has been long enough continued, the scoria is allowed to flow out, and at that time the iron hardens. The workman adds more of the pieces of crude iron, which he treats in the same manner, and so on a third and fourth time, till he obtains a mass of steel of about a hundred pounds, which is generally done in about four hours. This mass is carried to the hammer, where it is forged and cut into four pieces, which are further heated into square bars four or five feet long. When the steel is thus forged, it is thrown into water, that it may be easily broken, for it is yet crude and coarse-grained. The steel is then broken in pieces, and carried to another hearth, similar to the former. The pieces are laid regularly in the fire-place, first two parallel, upon which seven or eight others are placed across; then a third row across the second in such a manner, that there is a space left between those of the same row: the whole is then covered with charcoal, and the fire is excited. In about half or three quarters of an hour the pieces are made hot enough, and are then taken from the fire one by one, to the hammer, to be forged into little bars from half a foot to two feet long, and while hot, are thrown into water to be hardened. Of these pieces, sixteen or twenty are put together, so as to make a bundle, which is heated and welded, and afterwards forged into bars four inches thick, which are then broken into pieces of convenient length for use.

Converting of Steel by Cementation with Charcoal.—The quality of steel is intimately connected with that of the iron from which it is converted, and the iron made in Sweden is esteemed the best for the purposes of cementation. This process is almost wholly in the hands of the English, who pay a higher price for the iron, and by that means secure nearly all the iron of Röllagia, which is the best iron of Sweden.

The best marks of Swedish iron are: that called the hoop L, which is denoted by a circle, with an L in the centre; thus, [Circle L]: the G L; thus, [Circle G]: the double bullets; thus, [Circle Q]: the iron of these three marks bears nearly the same price, which is sometimes as high as 40L. per ton.

There are also the Swedish marks; as P L, [Circle P]: the hoop S, [Circle P]: and the gridiron, [Circle L]: which are worth a few pounds per ton less than the former; viz. from 34L to 38L, when the bell marks are 40L.

The Russian marks are, first, that called the C C N D: the mark is six Russian letters, C H E P B, worth about 37L per ton, when the others are at 40L. and the P S I, which is marked by the Russian letters P S I, is so inferior, as to sell for only 26L. or 27L.

It is to be lamented that, in the present state of our iron manufacture, we are unable to produce malleable iron which is equally fit for converting into steel with the Russian and Swedish iron. The general opinion upon this deficiency is, that it arises from some inferiority in the foreign ores of iron, but more immediately from the circumstance of their using charcoal of wood instead of the coke of pit-coal in smelting or reviving them; and some of our manufacturers do not hesitate to assert, that they can make iron with charcoal equal to the foreign in quality; but that in respect to price, the circumstances of this country will not allow them to cope with those countries, where the destruction of wood is in some measure considered as beneficial, by clearing the land for the operations of husbandry.

The Swedish and Russian iron is imported into this country by iron merchants in immense quantities, together, this trade being in the hands of a few individuals: by them it is retailed in smaller portions to the converters, whose furnaces are chiefly about Sheffield and Newcassel, who, after cementation, dispose of the greater part of it to the manufacturers of steel goods in the plate of blistered bars. Its value is estimated by the Swedish or Russian marks of iron, which still remain upon the bars. The manufacturers sell their bars to the tills, where they are made into common steel and shear or German steel, or they melt it to form cast-steel.

The conversion of iron into steel is performed in a furnace, hence called a converting furnace. The external building is a large and tall cone, similar to a glafs-house, within which, one or two large crucibles, called pots, are placed, and surrounded by flues in a manner befitting to communicate a constant and regular heat to every part of them. In these pots the iron bars are placed, being stratified in pulverized charcoal, and the pots are covered over with sand to exclude the external air.

A more perfect idea of the converting furnace will be had by referring to Plate VII. of Iron Manufacture, which contains a horizontal plan and two vertical sections of one of the furnaces used in the neighbourhood of Sheffield, with two pots for containing the iron. In all the figures, the same letters of reference denote the same parts. C is the external cone, built of brick or flone work; its diameter at the bottom varies in different furnaces, according to the size of the pots it contains: its extreme height from the ground to its vertex should not be less than forty or fifty feet to cause a proper draught. To create a sufficient heat for the procists, the top of the cone usually terminates with a cylinidrical chimney of some feet in height. The conical form of the external building is by no means essential; any form will operate in the same manner, if it is of a proper height; some are in practice built nearly in the shape of the small end of an egg, with a round chimney upon the top. The lower part of the cone is built square or octagonal, as is the plan of fig. 3. The sides are carried up until they meet the cone, giving the furnace the appearance of a cone cut to a square or octagonal prism at its base, and exhibiting the parabola where every side intersects the cone.

The conical building contains within it a smaller furnace, called...
called the vault, built of fire-brick or flue, which will withstand the action of a moist intense heat, without cracking or vitrification. D D in the section is the dome of the vault, and E E its upright sides, the space between which, and the wall of the external building, is filled up with rubbish and sand. The vault, as is shown in the plan, is always four-sided, that it may contain the pots which receive the iron bars to be converted. A B represent the two pots, built of fire-clay, each ten feet long, three feet deep, and two feet nine inches wide; the space between them is twelve inches wide; and directly beneath it is the fire-grate. The pots are supported by a number of detached courses of fire-brick, as shown at ee (fig. 1), which leave spaces between them, called flues, to conduct the flame under the pots: in the same manner, the sides of the pots are supported from the vertical walls of the vault, and from each other, by a few detached flues, (f, fig. 1.) placed so that they may intercept as little as possible of the heat from the contents of the pots. The adjacent sides of the pots are supported from one another by small piers of flue-work, which are also perforated, as shown at d (fig. 2.) to give passage to the flame. The bottoms of the pots are built of a double course of brick-work, about six inches thick; the sides are cut together are built of a single course of flue, about five inches in thickness; and the other parts of the pots are flue courses about three inches, the flue not requiring so much strength, because they have left heat and pressure to refulg.

The vault has ten flues or short chimneys, E E, rising from it; two on each side, to carry off the smoke into the great cone, shown in the plan 3, communicating with each side, and two at each end.

In the front of the furnace, at H, an aperture is made through the external building, and another corresponding in the wall of the vault; these openings form the door, at which a man enters the vault to put in or take out the iron: but when the furnace is lighted, these doors are closed by fire-bricks luted with fire-clay. Each pot has also small openings in its end, through which the ends of two or three of the bars are left projecting in such a manner, that by only removing one loose brick from the external building, the bars can be drawn out without disturbing the process, to examine the progress of the conversion from time to time: these are called the tap-holes; they should be placed in the centre of the pots, that a fair and equal balance may be formed from their result of the rest of its contents.

a b, in the elevation, is the fire-grate, formed of bars laid over the ash-pit I, which must have a free communication with the open air, that it may convey a current of fresh air to supply the combustion. The ash-pit should also have steps down to it, that the attendant to the furnace may get down to examine by the light, whether the fire upon the whole length of the grate is equally intense; and if any part appear dull, he uses a long iron hook to thrust up between the bars and open a passage for the air. The fire-place is open at both ends, and has no doors. The fire-grate is laid nearly on a level with the floor of the warehouse, before the furnace, and the fireman always keeps a heap of coals piled up before the apertures of the grate, to close the opening. This forms a simple and effective door; and when the furnace requires a fresh supply of fuel, a portion of the heap of coals is thrown in by a long hook, and the heat renewed, to stop any air from entering into the furnace, except that which has passed upwards through the ignited fuel, and by that means contributed to the combustion.

The fire-flues that compose all those parts of the furnace which are exposed to the action of the heat, are first hewn nearly to size, and finished by grinding two surfaces together, so that they make very perfect and close joints; when laid together, they are cemented with well-tempered fire-clay, mixed very thin with water. The fire-clay which answers best for this purpose, is that brought from Stourbridge, in Staffordshire, and is the fame of which the celebrated Stourbridge crucibles are composed; but very good fire-clay for the purpose is procured from Birkin-lane, near Chelford. When the furnace has been once burnt, this clay becomes equally hard with the flue, and is less liable to fly or vitrify in an intense heat, than any other known cement.

The process of charging the furnace with iron for conversion is conducted as follows. The bars of iron are first cut to the length of the pot; and for this purpose an anvil is placed at such a distance from the edge of the building, that the distance from the edge of a cold chisel wedged into the eye of the anvil, to the wall, will be just the length of the pots. One workman places the end of a bar against the wall, and lays the other end across the edge of the chisel, whilst another with a pile hammer strikes upon the bar till it is cut half through; then it is turned the other side upwards, and the end cut completely off. By this gauge the bars are all cut to one length, and a man enters through the door in the vault, to dispose of them in the pots: he is provided with a bale of fine pulverized charcoal, a sieve, and a shovel. An iron plate is put into the furnace, and lays over the space between the two pots to form the floor, upon which the man stands while at work. He commences his operations by sifted a layer of charcoal over the bottom of the pot, about half an inch thick, and he is careful in using the sieve to lay the charcoal of an even thickness in every part; but if it should not be carefully done, he levels it with the shovel. The workman on the outside now introduces the bars into the furnace through a hole, made by taking out a brick in the wall, just over the end of one of the pots, and the workman within deposits them upon the stratum of charcoal in the bottom of the pot, arranging them parallel to each other, and leaving an interval of about an inch between each bar. When the bottom of the pot is in this manner covered with iron bars, charcoal is again sifted upon them, and levelled with the shovel, to fill up the intermediate spaces between the bars, and to cover them about an inch thick; another layer of bars is then introduced into the furnace, placed upon the charcoal, and in its turn covered over with a stratum of charcoal; and in this manner the pot is filled to within two inches of the top. A layer of the sand which is found in the bottom of grindstone troughs, is then spread three or four inches thick upon the whole, to cover the pots up close, and prevent the access of the common air and flame. In placing the successive layers of bars in the pot, it is proper that each should be laid over the space between two of the bars in the layer beneath, because each bar will then be surrounded by a greater thickness of charcoal, than it would if they were laid directly over each other. Two or three of the bars should be left somewhat longer than the rest, and their ends should project through the trial-holes in the ends of the pots, and fastened round them in the holes to keep out the air.

The pots being both filled and covered up with the sand and rammed down, the holes for introducing the bars are closed by a brick or fire-clone, and luted with fire-clay. The apertures through the outer wall opposite the ends of the trial-holes are also stopped and luted. The iron plate upon which the man food is now removed, and the doors in the vault closed up by bricks wet with fire-clay; next, the opening in the external building is shut up, and the furnace is charged ready for lighting.

The furnace is kindled by lighted wood placed on the fire-grate, then a few coals are thrown in, and when well lighted, the quantity is increased; the heat thus generated rareifies the air contained in the vault and in the great cone; and
and being thus rendered of less specific gravity than the external air, it rises up in the cone, and a fresh supply rushes in through the bars of the grate, to restore the equilibrium. By going through the fire, this air parts with its oxygen, and excites the combustion, and becoming heated, rises up the chimney, and causes a very strong draught of air to enter the fire.

At first kindling, the fuel is supplied in small quantities, that the heat in the furnace may be gradually increased, and not endanger the cracking of the flues; in a few hours time the quantity of fuel is increased, so as to produce the full heat, which is to be maintained as equally as possible throughout the whole process. The fuel, which is pit-coal, is introduced at both ends of the grate, through small arches in the wall, which are in a line and on a level with the fire-grate, a quantity of coals being always left before the end of the arch to stop it up, and prevent any air getting into the furnace, without passing through the grate. Part of these coals is forced into the furnace, as before mentioned, when it requires a supply of fuel, which is generally at intervals of about half an hour each. The fireman frequently examines the appearance of the under side of the fire-grate, and judges from it the state of the fire; he improves it where necessary, as before described, by thrashing a hook up between the bars to make way for the air.

The flame arising from the ignited fuel upon the grate partly proceeds upwards between the pots, and heats them by that means; it then strikes the roof of the vault, and is reverberated down upon the pots, and escapes through the five flues or chimneys in the vault. The draught also draws the flame from the grate under the pots, and round the outside and ends. The principal object in this stage of the process, is to maintain the same degree of heat in every part of the pot, that every bar may be equally converted in the same space of time. The roof of the vault must be built of very good stone (none being better than from Roches quarry, in Atherover), to withstand the great heat exerted upon it; it is customary to build them very thin, and cover the outside with a small thickness of dry sand to keep them tight, in case of smoke cracking.

In this way the fire is kept up in as equal a manner as possible, until the iron is supposed to have imbied a sufficient portion of carbon from the charcoal to render it fit for its intended purpose: in this circumstance, the manufacturer regulates his judgment by his experience of former processes. About the time that he supposes the conversion to be sufficiently advanced, one of the trial-bars is drawn out from the pot, and by comparing the size of the blisters raised upon its surface with another bar which is known to be sufficiently carbonated, an idea is formed of the state of the furnace, and accordingly the fire is, at the proper time, discontinued, and the furnace is suffered to cool. Some manufacturers proceed to make experiment of the trial-bar by hardening and tempering it, so as to prove to a certainty the degree of its conversion, the blisters being found in some degree fallacious; for their size depends as much upon the degree of heat to which the bar has been exposed, as upon its carbonization, and the rapidity with which the conversion has carried on, rather than its actual state.

The time which the iron is required to be in the process of cementation depends upon a variety of concurrent circumstances. 1. The degree of carbonization required to form a steel of the proper quality; this varies with the use the steel is to be applied to. 2. The heat it is subjected to. 3. The nature of the iron employed in the process. The combinations of these circumstances are so numerous, that nothing but long experience can determine the proper duration of the process.

In general terms it may be observed, that a short period will produce a steel very soft and tenacious, which, when properly treated, will possess ductility as its most striking property, and is therefore very proper for springs, wire-drawing, and other purposes requiring ductility, but without the hardness requisite for edge-tools. The period of cementation for such steel varies in different manufactories, from four to six days and nights.

Steel which requires more hardness, but at the same time sufficient tenacity to resist sudden shocks, such as the edge-tools for working wood are subject to, must be cemented a longer time. This, which is mostly tilted into plain steel, is cemented five, or seven, or eight days, according to the heat and the quality of iron employed. The steel employed for manufacturing tools for cutting metals and hard substances being but small in demand compared with the others, is not cemented a longer time, but is returned into the furnace at the next charge, along with a charge of iron, and cemented again with fresh charcoal: this is termed double converted steel.

But for some fewer purporses, such as the turning and boring of cast-iron, the steel is converted three times; in this state it becomes so hard and brittle as to be totally unfit for any purpose requiring tenacity, or for any cutting edge which is less than an angle of 70 degrees, or it would be continually breaking.

The steel which is requisite for the processes, must be as great as to give the iron nearly a welding heat, but if carried farther, will endanger melting the bars when the process has proceeded some time; an accident which has frequently occurred through the inattention of the fireman. It is observed by manufacturers, that the carbonization proceeds quicker when the heat is greatest, and for this reason the duration of the processes varies in different furnaces, in some measure from their construction, in urging a greater heat, and this depends chiefly upon the height of the chimney, and the draught it occasions.

When the conversion is supposed to be complete, the furnace is suffered to cool, until a man can conveniently enter the furnace, to take out the bars and remaining charcoal, and prepare the furnace for a new charge. The bars which are brought out are (from being covered with blisters upon the surface) termed blistered steel.

On examination of the fracture of a blistered bar, it is found full of internal cracks, which are generally parallel to the flat side of the bar: some of them are larger than others, and extend the parts of the bar sufficiently to raise numerous protuberances or blisters upon its surface. These cracks have every appearance of being opened by the expansive force of some gas generated in the iron during the process, but what the nature of this gas is, still remains to be investigated. It seems to arise from the body of the iron itself, by the crack being within the solid substance of the bar. The fracture of the blistered steel is exceedingly irregular, of a white colour, like frosted glass, and appears like an irregular crystallization; but the facets exhibited are larger in proportion as the cementation has been longer continued, and from this reason they are larger towards the surface of the bar than in its centre.

The furnace above described is of that kind which is esteemed the best for the processes, and is most generally employed in and about the neighbourhood of Sheffield in Yorkshire, where the manufacture of steel is carried on at a larger scale than in any other part of England. The furnaces used at Newcastle, which is another seat of this trade, are very similar.

The charge consists of twelve tons, each pot containing six tons of iron; and it is necessary that all the bars converted...
TILTING OF STEEL.

at one proceeds he of the same size, or the smaller ones would be thoroughly converted before the others had taken up a sufficient dose of carbon. This large quantity of a single article is more than the trade of some manufacturers will dispose of, they therefore employ smaller furnaces, which contain only eight tons, and such are generally constructed but with one pot ten feet in length, three feet broad, and two feet deep: the fire-place is directly beneath the pot, twenty inches wide, and fluxes are carried round it on both sides and ends: the vault and chimney of such a furnace are the same as the double pot. It is found by experience that the small furnaces consume somewhat more fuel in proportion to the quantity of iron they convert, than the large ones, because the heat lost in the beginning and end of the processes, and that transmitted through the walls of the building, is the same in both inferences.

Mr. Daniel Little of America, in 1785, recommended a new substance to be used in the cementation of steel instead of charcoal: it is the marine plant known by the name of rockweed, or rockware, and is found in great plenty on rocky shores in America. It was to be prepared by first mowing it from the rocks by the scythe or sickle, and spreading it out on dry land till the rains have washed off the greater part of the sea-salt; it was then to be dried and pulverized, and may be used as any other cement for making of steel. He says that he discovered this property in an experiment where a small piece of iron was put into a crucible, and filled with the powdered plant as a cement: after it had been exposed to little more than a cherry heat for five or six hours, it was converted into steel.

All cemented steel in its raw state, after it is taken from the converting furnace, is called blistered steel; because the surfaces of the bars are covered with blisters, and on breaking a bar it is found to be full of cavities within, which seem to have been opened by some gas generated in the iron when in the processes of cementation, and to have raised the surface into blisters, which are hollow within. In this state the steel is not fit for any purpose, because of the numerous cavities, and from the great disposition it has to break with the most irregular and rugged fracture imaginable. To render it found and tenacious, it must be well hammered while at a moderate heat, which operation is termed tilting the steel, because it is done under the tilt-hammer, worked by machinery. There are many reasons why the hammering of steel cannot be sufficiently performed by hand: the principal are, that the expense of labour would be too great to answer, and that a man could not strike hard and quick enough, to complete the operation at one heat of the steel: if more than one heat is taken, the steel will not receive so much advantage from the hammering, because when it is heated, its pores are opened; and if suffered to cool without hammering, the grain of the steel will be found considerably coarser; therefore, every time it is heated, the good effects of the previous hammering are in a great measure lost. Tilt-hammers are worked by water-wheels or steam-engines, according to the local situation of the manufactory. (See a description in the article Tilt-Hammer, Plate VIII. Iron Manufacture.)

The same axis is made to actuate three or four tilt-hammers placed side by side, and the hammers are not all of equal lengths, each one being shorter than the next: by this arrangement, when they are all working together, the workman of one tilt does not inconvenience those employed at the other two. The anvils of the hammers are nearly on a level, or at most only a few inches above the surface of the ground; and the workman fits his or her foot, for the purpose, in a direction perpendicular to the heave of the tilt, upon a seat which is suspended from the roof of the building by two iron rods: by this means he can with the greatest ease advance to or from the hammer, by just touching the ground with his foot, and pushing himself backwards or forwards as he suits in the working. The three seats are in parallel directions, but sufficiently distant from each other, in consequence of the different lengths of the hammers, to allow the workmen to perform their business. At a convenient distance from each tilt, is placed the forge for heating the steel. The two forges for the small hammers are placed together under the same dome, while the other forge is by itself near the great hammer. The bellows for the hammers are worked by a small crank on the end of the gudgeon of the shaft; they are placed over-head in the roof of the building, and a copper pipe conveys the air to the tue iron. The forges are like those used by smiths, except that they have a small cover built of fire-brick over the hearth: the cover is square within, about eight inches wide, eight high, and eighteen inches or two feet long. It is open in front, to introduce the bars. The coals are placed on the hearth, as smiths usually do, and the brick cover acts, to reverberate the flame down upon the steel, and give a very regular heat. Each workman at the tilt is attended by two boys, who heat the steel at the forge, and convey it to the workman, that he may lose no time: another boy attends each tilt to take away the finished rods and cut them to length, and then to straighten them.

The operations of the tilt are conducted in the following manner: Suppose a piece of steel has been heated by one of the boys, and brought to the man at the hammer, he places it upon the anvil, at a point nearest to the centre of the hammer, where its surface is reduced to a round edge, about an inch wide; the face of the hammer is made round, to correspond with the anvil, and from its similarity to the edge of a smith's hammer, may be called the pen of the hammer and anvil. The machine is always in rapid motion, and between every stroke that the hammer makes, he moves the bar forwards on the anvil, that it may be struck by the edge of the hammer in a fresh place. If the bar is flat, as blistered steel usually is, it is first hammered in this manner upon its edge, to reduce it to a square, and at the same time draw it out in length. When it has been hammered thus all its length, the surface becomes indented on both sides by the edges of the hammer, the anvil being bounded by waving lines. This first operation is called notching down. The tilt then removes the bar beneath the flat face of the hammer, and the rod is flattened at every stroke, and all the indentation removed; when he gradually recedes from the hammer, drawing the rod along, and flattening it all the way. When the end of the rod comes under the hammer, he turns the other face of the rod upwards, and advancing to the hammer, pushes the rod forwards under it: in this manner he proceeds, flattening it on one side or the other, until he brings it to the proper figure, which he tries by a gauge. The moment it is finished, the boy brings another piece of hot steel, which he places under the hammer, and then the other boy takes away the finished rod from the tilt, who takes the fresh piece: in doing this, they are careful that the hot piece of steel is placed under the hammer before the other is taken away, that the faces of the hammer and anvil may not strike together, when there would be danger of breaking them, as they are both made of cast-iron: the second piece is tilted in the same manner as before, and when finished, is changed for another.

The perfection of tilting steel, depends upon drawing out a rod perfectly straight to the same size in every part of its length. Many workmen, particularly at Sheffield, have acquired such skill and dexterity in the management of the rod while under the tilt, that their work is as straight and even
as though it had been drawn through a steel-plate, in the same manner as wire, and all its angles perfectly square: its surface is of a black polish, and so smooth as though it had been filed. All artists use the square steel rods for making their tools; and the straightness and regularity of the rods are such, that a person who has not been an eye-witness of the operation, would scarcely believe it possible to produce such accurate work from the blows of a hammer. The points to be attended to by a tilter are, that in notching down the bar to draw it out to length and size, he cau- ses the blows to fall exactly at equal distances from each other, unless (which seldom happens) the bar should have any part thicker than the rest; it frousks much, and is a little nearer together in that place, to reduce it all to one size. Afterwards, to flatten the bar, he must be careful to place the bar truly flat upon the anvil, and hold it in the same plane, while he draws the bar under the hammer, and that he moves himself with a perfectly equable motion, that every part of the bar may be alike subjected to the action of the hammer: the surface will then be true, and free from undulations. Another circumstance to be attended to, is, when he turns the bar upon the anvil to hammer the adjacent sides, that he makes them truly square to the former sides. These things must all be done in so little time, that it requires long practice and experience to perform them well. Beginners are always apt, when they place their feet on the ground, to move themselves too quick just at that time, which causes the bar to be thicker at that place.

The different methods of conducting the operation of tilting, give the steel different qualities, which are distinguished into 1. Common steel; 2. Shear or Newcastle steel, also called German steel; and 3. Tilted cast steel.

Common steel is made by tilting bars of blistered steel, and drawing them out into rods of any size. The blistered bars are of various sizes, but in general about an inch and a half broad by half an inch thick. If these are to be drawn into rods half an inch square, they are broken into convenient lengths to handle, and one end of each piece is heated to a good welding heat by the boy who attends the forge, who puts three or four in the fire together, and, according to their size, he learns by experience at what time he must put every one into the fire, that it may acquire the proper degree of heat by the time that the tilter shall have just finished the other bars.

The tilter first begins by notching down the narrow edge of the bar, holding the other end of it in his hand, and notches down such a length of it as experience teaches him will be sufficient to form a rod of the length and size required. The notching on the edge of the bar rather increases its thickness, while it diminishes its breadth, and brings it nearly to the square figure of a rod: he then flattens it, and begins again to notch it down upon the broad side; afterwards he again flattens it; then proceeds to notch it upon the edge, and afterwards to flatten it once or twice on both sides, and the rod is finished.

When a skilful tilter has been some hours at work upon rods of one fize, he judges by sight when the rod is of the proper fize; but on first beginning, he tries it by a gauge, and flattens it repeatedly, if necessary, the boy bringing a piece of hot steel to place under the hammer while he is gauging, and which is drawn out in its turn. When the tilting is completely finished, the steel rod is taken away by another boy, who, with a pair of thcares, cuts off the rod from the blistered bar from which it was drawn out. He places the rod on a flat caft-iron table, and sets it truly straight by a hammer, then stumps the bar with a mark of the quality of the steel, and it is finished.

All these operations are performed in so short a time, that the rod still retains a red heat; but this will excite less surprize when it is considered that the hammer strikes four hundred blows per minute, and falls with great weight, so that it soon completes the work, and it is very probable that the great percussion it exerts upon the steel in some measure prefers the heat. It is well known that blacksmiths are in the constant habit of lighting a match to kindle their fire, by only hammering a small piece of iron quickly, and turning it about under the hammer, and in a short time it acquires sufficient heat to inflame the sulphur of the match. This heat most probably arises from the friction which the hammer cau- ses amongst the particles of the iron, by rubbing them violently against one another; and the smiths observ e, that the iron will not become red-hot if it is always struck upon the same face; but it must be turned round, that a new surface may be continually exposed to the action of the hammer.

Steel is so called, because the thcares for dressing woollen cloth are made of it. It is also called Newcastle steel, because formerly made there; and German steel, because the natural steel in Germany is treated in the same way; it is likewise called faggotted steel. To make steel, the bars of blistered steel are broken into lengths of about eighteen inches; then four or more of these are laid together with one of double the length, and all four are tied together with pieces of small steel: this is called a faggot, and is placed in the forge, to be heated to a good welding heat; it is then taken to the tilt, and notched down on both sides, to weld all the bars together, and close up the internal flaws. The workman holds the faggot by the end of the long bar as a handle; the operation of welding takes but a few seconds, and a small rod is then drawn out from a piece of the end, in the same manner as drawing out common steel.

Cast steel is prepared by melting fragments of blistered steel, and casting them into an ingot. (See STEEL.) The ingot is then drawn out under the tilt into the required fize, and the manner of doing this is the same as for common steel.

It is the custom of the manufacturers of cutlery and steel goods to purchase steel from the converting furnaces in the plate of blistered bars, which they send to the tilt-mills to be drawn out into the fize they require for their use: this is done at regular prices. In tilting steel, a trifling loft is sustained by the metal oxidizing upon the surface, and throwing off black scales. The manufacturers are in the habit of allowing 46 to 8 lbs. per hundred weight for such lofts: this latitude is given, because in drawing the bars out into rods of a small fize, the waile must necessarily be greater; the metal being much longer exposed to oxidation, and the surface throwing off more scales.

TILUTHA, in Ancient Geography, an island of Asia, in the Euphrates, about 33° 55' lat.

TILWARAH, in Geography, a town of Hindoostan, in Gurry Mundella; 5 miles S. of Gurrah.

TIM, a town of Ruffia, in the government of Kurak; 44 miles E. of Kurak. N. lat. 51° 40'. E. long. 35° 34'.

TIMA, TIMAH, TAIMA, TALBA, or TI ALBA, a town of Arabia, in the province of Nedsjed; 180 miles N.N.E. of Medina.

TIMACUM, in Ancient Geography, a town placed by Ptolemy in Upper Media, at a distance from the Danube.

TILÆA, a town of Asia, in the interior of Bithynia. Ptol.

TILMæUS, the Locr'ian, in Biography, was a philosopher of the italic school, and flourished in the time of Plate, who derived from him principally the doctrine of Pythagoras, and whose book, entitled "Tilmæus," was 4 P 2 founded
TIM

The timariots are obliged to serve in war, personally, with as many men and horses for service as their timar, by the estimate made of it, contains 2500 apers, or about $6. stering; and to maintain them constantly mounted and armed after their manner, to be ready to march at all hours when commanded, and that on pain of death; nothing, not even sickness itself, being allowed to excuse them.

Besides this service, they likewise pay an acknowledgment of one-tenth of their revenue. If they have any children of age to bear arms, and fit for the service after their decease, or, in defect of this, if they have any relations that have the least interest, the timar is used to be continued to them on the same conditions, otherwise it is transferred to others.

If the revenue thus held of the grand signior exceed 15,000 apers, or 36l. sterling, they who hold it are not called timariots, but sibaffi, or zaims: these always have the administration of justice in the place, under the fagiac of the province.

The timariots have different appointments, from 4000 or 5000 apers, equal to about 12l. sterling, to 20,000 apers, but unless their timar exceed 8000 apers, they are never obliged to march, except when the grand signior goes to the army in person, on which occasion none are exempted.

The origin of the timariots is referred to the first sultans, who, being masters of the fiefs or lands of the empire, erected them into baronies or commanderies, to reward the services of their bravest soldiers; and especially to raise and keep on foot a number of troops without disbursing any money.

But it was Solyman II. that first established the order and discipline among these barons, or knights of the empire; and by his order it was, that the number of horsemen each should maintain was regulated.

This body has heretofore been not only exceedingly powerful, but great and illustrious throughout all the empire; but avarice, the ordinary fault of the Orientals, has occasioned their declension of late years.

The viceroys and governors of provinces manage their matters so at court, that timars, even out of their jurisdiction, are given to their domestics, or to such as will give them the mohl money for them.

There are two kinds of timariots, the one appointed by the Porte, the other by the viceroy of the country; but the revenues of both are less than those of the zaims, and their equipage and tents less in proportion.

Those who have their patents from the court, have from 5000 or 6000 apers to 15,999 apers per annum; if they have one apser more, they become zaims. Those who receive their patents from the viceroy, have from 3000 to 6000 apers per annum.

This cavalry is better disciplined than that properly called the Iphahis, though the Iphahis be the neatest and briskest. These have only light in plateaus; whereas the zaims and timariots are divided into regiments, and commanded by colonels, under the direction of bakhaws. The bakhaw of Aleppo, when in the army, is colonel-general of this militia.

TIMARIOTISTAN, in Geography, a town of Persia, in the province of Farilkan; 15 miles E. of Pafa.

TIMAVO, a river of Carniola, which runs into the gulf of Trieste, near Duino.

TIMAVUS, in Ancient Geography, a fountain, lake, river, and port of Venetia.

TIMBANG, in Commerce, a measure at Batavia for rice, pepper,

founded on his book "On the Nature of Things." Prorus preferred a small treatise of Timaeus "On the Soul of the World," and it is prefixed to some editions of Plato's Timaeus. In this treatise, chiefly Pythagorean, he differs from Pythagoras in the following particulars: viz. that, instead of one whole, or monad, he supposes two independent causes of nature, God and Mind, the source of intelligent nature, and Necessity or Matter, the original of bodies; and that he explains the cause of the formation of the world, from the external action of God upon matter, after the pattern or ideas existing in his own mind. Upon a comparison of this piece with Plato's Timaeus, it will be found that the Athenian philosopher has obscured the simple doctrine of the Loecian with fancies drawn from his own imagination, or from the Egyptian schools.

In the time of Ptolemy Philadelphus there was a Sicilian, named Timaeus, who was a celebrated historian; but none of his writings are extant. He died at the age of 96, B.C. 262. Brucker by Enfield, vol. 1.

TIMAGENUS, in Ancient Geography, an island in the Arctic gulf. Ptol.

TIMANNA, in Geography, a town of South America, in the province of Popayan; 80 miles E. of Popayan. N. lat. 2° 12'. E. long. 74° 46'.

TIMANTHE, in Biography, a famous Grecian painter, was, as it is said, a native of Cythnos, one of the islands called Cyclades, or of Sicvyn, and flourished about the year B.C. 400. The mind of this artist is supposed to have surpassed his art, in the exercise of which he displayed great skill, so that in his performances, something was to be understood, which he did not express. As an instance of this, we are referred to his picture of Iphigenia about to be sacrificed, in which, having exhausted every variety of the expression of grief in the other spectators, he has thrown a veil over the face of her father, thus intimating that his anguish surpassed all external tokens. In his Sleeping Cyclops, exhibited in a small tablet, he has introduced Satyrs measuring his thumb with a thyrus, in order to give an idea of the magnitude of the principal figure. At Samos he was a competitor with the famous Parrhasius in a piece, of which the subject was the judgment for the arms of Achilles, between Ajax and Ulyseus; on this occasion the prize was awarded to Timanthes. In the temple of Peace at Rome a hero of admirable workmanship by the same artist was preferred. Pliny Nat. Hist.

TIMAR, a tract or portion of land, which the grand signior grants to a person on condition of serving him in war, or horseback.

Some define the timar a portion of land assigned to a saphi, or other person to serve on horseback, to enjoy, during life, for his subfiliation.

Menaski describes it as a stipend or revenue, granted to old soldiers who have deferved well, in lands, and possessions of castles, towns, villages, fields, or in tithes, and other fruits and incomes; sometimes with the privilege, jurisdiction, or signory of the said places.

The timar is a kind of fief granted for life. The whole Ottoman empire is divided into fagacaries, or baronies, under which all fuch as hold timars, who are called timariots, are bound to fatisfy themselves when summoned upon any expedition. Timars may be resigned as benefices among us, only obtaining the content of the begleheroy, or governor of the province. Indeed, for timars of above 2000 apers per annum, cal. a sain, the grand vizier alone grants dispensations.

TIMARIOTS, those who enjoy lands on the footing and tenure of timars. See Timar.
pepper, and other dry goods. It is reckoned at ten facks, or five pikuls: another measure is called kulaack, and weighs 74 cattis: 7 kulacks make one timbaug, liquid measure.

**TIMBER**, in *Geography*, a river of Prussian Lithuania, which runs into the Neman; 4 miles N. E. of Wipe.—Also, a town of Prussian Lithuania, 6 miles W. of Ingham.

**Timber**, or **Timber-Trees**, in *Rural Economy*, that sort of wood produce which is useful and proper for the purposes of building, the construction of tools, implements, carriages, &c.; or such large trees of different sorts as have reached their full or suitable states of growth, and are in situations fit for being cut down for use. The various kinds of trees which are the most useful and important in this intention, have been noticed and considered in speaking of the nature of common and other plantations and planting; but they are chiefly the different sorts of pines, the larch, the birch, the common ash, the mountain-ash, the beech, the fycamore, the elm, the oak, the hopt: and common chestnuts, the alder, and the poplar. However, in general, the oak, the ash, the elm, the larch, and the Scotch pine, are by much the most useful and valuable for all the different uses of this nature.

We shall here mention from Evelyn's Sylva, &c. some of those kinds of timber that are most serviceable, and give a brief view of the uses to which they are applied, referring to their several denominations and other collateral articles for a further detail.

1. **Oak**, the uses of which need no enumeration; to endure all fasons and weathers, there is no wood like it: hence its use in pales, shingles, posts, rails, boards, &c. For water-works, it is second to none; and where it lies exposed both to air and water, there is none equal to it.

2. **Elm**: this, felled between November and February, is all spine or heart, and no sap; and is of singular use in places where it is either always wet, or always dry; its toughnefs likewise makes it of use to wheelwrights, millwrights, &c.: nor must it be omitted, that its not being liable to break and fly in chips, makes it fit for dressers and planks to chop on.

3. **Beech**: its chief use is in turnery, joinery, upholterly, and the like, as being of a clean, white, fine grain, not apt to bend nor split: it has been sometimes, especially of late, used for building-timber, and if it lie cleanly wet, is judged to outlast oak.

4. **Abe**: its use is almost universal; it is good for building, or other occasions where it may lie dry: it serves the carpenter, cooper, turner, ploughwright, wheelwright, gardener; as also it is used at tea for oars, handspikes, &c.

5. **Fir**, commonly known by the name of deal, is of late much used in building, especially within doors, for floors, ceilings, windowfr, and most works of ornament.

6. **Walnut-tree**: this is of universal ufe, excepting for the outsides of buildings; none is better for the joiner's use, it being of a more curious brown colour than beech, and less subject to worms.

7. **Chesnut-tree**: next to oak, is the timber most sought for by joiners and carpenters. It is very lasting.

8. **Service-tree**, used in joinery, as being of a delicate grain, and fit for curiosities: it also yields beams of considerable size, proper for building.

9. **Poplar, abrided and open**, differing very little from one another, are much used of late instead of fir: they look as well, and are tougher and harder.

10. **Alder**, much used for fewer or pipes to convey water: when kept always wet, it grows hard like a stone; but where sometimes wet, and sometimes dry, it rots presently.

The uses of timber are so many, and so great, that the procuring of a sufficient supply of it extremely well deserves the care of every estate; as it must be a great disadvantage to it to be obliged to have recourse to its neighbours, and purchase, at a very considerable and continually renewed expense, what might, by an early economy, be sufficiently supplied at home.

This economy, however, must be applied in time; for our natural indolence, our love to reap the advantages of every thing ourselves, and our little care for posterity, give great room to fear succeeding ages will want wood, both for private and public exigencies. All our arts should be employed on this subject, with two views, the one to preserve and cherish our growing wood, the other to renew the trees which have been, and are continually cut down.

The quantity of acorns which the oak bears, has made many people suppute, that Nature has taken care for a renewal for us; and that of this vast quantity of seed, which annually fall, there will be always an over-sufficient supply of young trees, which will grow up in the place of the old ones: but experience proves, that this is by no means the case. The greater number of the fallen acorns is devoured by many different animals, for whose nourishment Nature has provided that abundance of them: and of those which escape this fate, we are to consider how few can come to good, from the natural accidents they are unavoidably exposed to; they fall on a covered ground, where dead leaves, and decayed parts of branches of trees, usually prevent their touching the earth, into which they are to shoot; or, if they can shoot here, it is merely from the surface, where they are, in their slow growth, liable, while very tender, to all the inclemencies of frosts; and add to this, that it is very difficult for such tender plants as the young feedlings of these to find room for growth or nourishment among the every-way spreading roots of other trees; and the continual shade and want of free air, must render them very weakly and irregular in their growth, even supposing them to get over all the other difficulties.

It is very certain, that timber-trees of oak are frequently met with among the underwood of forests; but we shall always find this to be the case, not in the close places, but in certain spots, where there has been a vacancy or opening; and that usually, where there are not, nor have at any time been, oaks in the neighbourhood of the spot. The acorns that fall from the oaks usually come to nothing from the before-mentioned accidents; and these trees which grow at distances, are owing to the acorns brought thither by birds, and accidentally dropped there. This is an inference familiarly verified, by observing, that there are frequently little bushes near wood, which, though of white-thorn or other trees, are usually surrounded and ornamented with young oaks; the jays and the like granivorous birds are the authors of this crop; for bringing the acorns from the adjoining woods, to eat under these bushes, they drop many by the way, which they do not trouble themselves to look for on the ground, and which having here a freer ground to strike root into, and an open air to grow in, seldom fail of coming to good, unless destroyed when young.

In order to the preservation of our growing timber-trees, it would be a very useful law, that all who cut down any number of oaks, should also leave a number in good condition for after-cutting; and that no timber should be cut down, but at a proper age, in regard to the nature of the soil;
failing; since it is certain, that trees grow to their perfection at very different periods of time, in proportion to the depth of soil they have to grow in; and that as it is, on the one hand, not for the interest of the state to suffer trees to be cut till at their perfection for size and founds, so after they are arrived at their perfection, it is equally certain that they gradually decay.

The quality of the soil the tree stands in may be necessary to be observed to this purpose; but the quantity or depth of it is the great subject of enquirie; and a great number of observations has proved, that the proper season for cutting oaks, in a soil of two feet and a half deep, is at fifty years old; those which stand in a soil of three feet and a half deep, should not be cut down before seventy years; and those which stand in a soil of four feet and a half deep, or more than that, will increase in goodness and in size till they are a hundred years old; and observation has proved, that after these several periods, the trees begin to decay.

This seems the best rule to establish, in regard to the common soils; but those which grow in a lighter or more sandy soil, may have their periods changed from these to forty, to sixty, and to eighty years at the greatest depth; and after these times it is always best to fell the wood meant for public service, whether then wanted or not, since it is much better to keep it in public magazines, than to leave it to be daily decaying.

Heaths, and other uncultivated places, where there is no regular growth of wood, but where fern and useless plants alone seem to flourish, usually afford also some sprawling trees of the oak. These probably have had their origin from acorns dropped by birds; but they seldom grow tall or regular; since, not having been defended from the injuries of cattle, they are usually browsed on, and fluntet while young, and so become crooked and short-trunked, or pollard-trees. These, though not of such value as the more regular oaks, yet deserve care, both with respect to their preservation and felling; since they afford a number of trees naturally bent, and formed for many parts of ship-building.

The little care usually taken of these trees, though on this occasion of great value, seems to threaten a general loss of them; but as trees, thus naturally crooked and bent, are of value, it is a laudable attempt to try at the finding of a regular method of producing such; and this is easily practicable, by following the same methods by which these wild ones become so. They wholly owe their figure to the cattle’s biting off their tops while young, and afterwards biting off again the tops of the shoots from the first wound. In this manner, if a number of young trees, set apart for the experiment, have their tops cut off at two, four, six, eight, ten, and twelve feet from the ground, and four years afterwards the shoots from these flunted tops are again cut in the same manner, the trees will be found afterwards to grow up in all the irregularly crooked figures that can be conceived, and by this means a supply of naturally crooked wood may be raised for all the occasions of ship-building, with infinitely greater ease, and more certainty, than by the method proposed by some, of bending them down with weights tied to their tops while young. See Growth of Crooked Timber.

As to the supply of young wood in the place of what is cut down, there are some circumstances which have not had the attention paid to them which they deserve. The spring frosts, which come on at a time when the shoots, by which nature is to raise the supply for what is cut down, are just preparing to grow, are of prodigious injury, and do not less mischief to thee than to the young shoots of garden plants, though the diligent hopes of the succession of the proprietor, and usually also the distance of the place, and want of repeated observations, occasion its not being perceived. This, however, may in a great measure be guarded against. Frequent experiments and repeated observations prove, that the mischief done by these frosts affect in a much greater degree those shoots which are exposed to the south, than those which face the north; and that it is greatly more possible against such as are wholly exposed to the wind, than against such as are sheltered. These known circumstances may give the hint to a method of saving, at least, a great part of the wood to be felled from this destruction, to its renewal, by the making it a rule to begin cutting down on the north side; and, as the whole felling is a work of some years, the standing wood of every season will defend the young shoots of the newly-cut stumps the following spring, not only from the south exposure, but will shelter them also from the wind.

Many prudent managers have made fine eftates of their coppice-woods, by regularly felling a certain portion every year, and providing for a renewal of the first cutting, against the felling of the last portion, by proportioning the time of growth to the quantity to be cut every year; and there is great interest to be made of a true knowledge of the growth of wood in this manner. Whoever observes the growth of young trees, will find that the second year’s growth is much more considerable than that of the first; the third year is more than that of the second, and so on for many years; the yearly growths of young wood greatly increasing every season up to a certain time or age of the tree, after which the increase in bulk, by growth, becomes gradually less. The great advantage to be made of coppice-wood, would be by knowing this interesting period, and feizing on it, always to cut down the trees jut at that time when they arrived at the end of their quick growth, and so setting nature to work with new shoots, to employ the same on enriching again the owner. Regular observation and experiment alone can ascertain this happy period; but any man who has much coppice-wood upon his estate, may affure himself of it, by cutting a given quantity every year, for ten years successively, and then carefully reviewing the differences of the yearly produce. Memoirs Acad. Sc. Ann. 1739.

On the businefs of raifing and growing good timber, or trees of that fort, Mr. Loudon has thrown out fome interefting, ingenious, and philosophical hints and suggestions, as well as flated fome strong facts in confirmation of them, in his work on forming and improving country refidences. It is confidered as remarkable, that the matter has never particularly engaged the attention of thofe who have been employed in describing the methods of rearing trees. The effects of culture on other vegetables is fo great, it is faid, as always to change their appearance, and not unfrequently to alter, in a confiderable degree, their nature. The common culinmary vegetables, and cultivated graffes, affume fome different an appearance in our fields and gardens from what they do in a ftate of wild nature, that even a perfon accu- tom’d to the nature of plants might eafily be deceived in regard to the species or kind. The fame general laws operate upon the whole kingdom of vegetables; and whence it is thought plain, that the effects of culture upon trees, though different in degree, must be analogous in their nature. It is true, it is faid, that as yet we are pollefsed of no great number of either experiments or observations, to enable us to determine with minute accuracy the precise extent of
of these effects; but still a person practically conversant with the
subject, who shall pay attention to what he may notice to
be taking place in different parts of the country, and
who professes a sufficient knowledge of the vegetable
kingdom and physiology to reason from analogy, may, it is
thought, deduce such general consequences, as will suggest
important practical rules and regulations.

It may be proper, it is said, to remark, that by culture
is not meant merely the operations upon the soil, or on even
the form of the particular tree; but every thing that tends
to remove it from its natural state in order to accelerate vege-
tation. It is considered too, that a tree is in a natural state
whenever it has sprung up fortuitously, and propagates itself
without aid from man: whether it be in crowded forests, woody
wales, or in scattered groups on hills or commons.

Some trees and other vegetables may be said to be natural-
ized to situations which, but for art, they probably never
would have grown upon. Thus, for instance, mountain
plants are sometimes found common in plains, and even
meadows; and alpine trees which disseminate themselves in
level and warmer parts of the country: but then the person
who is conversant with such matters, by comparing the effects
of these different situations on the vegetable, always knows to
select as general nature that which perfects all the arts,
and where the soil and situation be best suited for the repro-
duction of the species or fort, and the prolongation of indi-
vidual life. These rules are, it is said, founded in nature.

For example: no person, judging from them, could mistake
a warm English common as the natural soil and situation of
Scotch firs, though they not frequently disseminate them-

selves there. Is, indeed, well known to every one in the
leaf conversant with the vegetable economy, that in all her-
baceous vegetables, and even shrubs of considerable size,
the effect of removal to an improved soil, climate, and situation,
is to expand the parts of the whole vegetable: that the
effect of removing or cutting off part of the vegetable above
ground is to expand those parts which remain: that the
effect of removing anything of the parts under ground, or of
removing the whole vegetable into a colder climate and less
congenial soil and situation, is to contract or confound the
whole. This, were it necessary, could, it is said, be
illustrated in a thousand instances from the commonest vege-
tables: but for the present purpose, it is only necessary to
notice further, that this takes place more or less in a degree
corresponding with the rapidity of the growth of the vegetable,
and its duration. Thus, all the annual grasse are much far-
ther removed from a state of nature by culture than the per-
ennial ones. So are the annual garden vegetables, as cab-
nages, legumes, and spinach, in opposition to strawberries,
aparagus, and many others. Quick growing trees or shrubs,
as willows, raspberries, and some others, are also much easier
removed from their natural state, than such as oaks, thorns,
hollies, and heaths, which grow much slower. If these
remarks and conclusions be just and well-founded, which, it
is supposed, none will deny, it must follow that the same
general effects take place more or less on all trees; that
when they are removed into a colder climate, or have part of
their roots cut off, it will in some degree contract the fibre
of the wood, and render it a of more fold and hard texture;
and that when they are removed into a warmer climate, have
most of their branches taken off, or are placed in a better
state, it must, by accelerating their growth, it is thought,
tend to expand the fibre of the wood, and of course render
the wood fitter and more liable to suffer by the action of
the common elements, when the tree is cut down and applied
to use. That this does really take place, will, it is said, be
gathered from the detached facts stated below, which have
come to the writer's knowledge, and to which every prac-
tical unprejudiced person, who has visited different parts
of the kingdom, will, it is thought, be able to add many
others from his particular observation, attention, and exa-
mination.

First, that every hedger and forester knows, that furze and
thorns, which have been cultivated in fields or hedges, are
of a much softer or wider grain, and are much easier cut over
with the hedge-bill, than such as spring up from feed in a
wild fenery, and never undergo any sort of pruning or cut-
ing in, nor any kind of culture in any way. They know
too, that in a common to be cleared of furze or thorns, or
in a hedge to be cut over, there are some parts which require
a much lighter stroke of the hedge-bill than others; and
that those parts easiest to cut, are uniformly those where the
plants have grown the quickest:—gardeners experience the
same thing in pruning or cutting over fruit-trees or shrubs.
Thus the difference between the texture of the cultivated
and the wild rasperry is, it is said, striking, though the stem
of one is nearly double the thickness of that of the other.
In all the other of these cases, the stem of both are sup-
posed alike in diameter and cleanliness, or absence of knots;
though the same thing would, it is thought, take place in
a considerable degree, even if the stem of the cultivated or
quick growing one were thicker than that of the other in
the wild state. Supposing that there were no other proofs
this, it is contended, clearly shews that cultivation, or what-
ever tends to increase the growth of a tree, tends likewise to
expand the vegetable fibre. But there are other conver-
uing proofs, it is said, which demonstrate this, and at the same
time shew, what few, it is supposed, will doubt, that when
the vegetable fibre is expanded, or when the annual ringlets
or circles of wood, produced by a tree, are soft and larger
than the general annual increasement of such tree, the timber
must be less hard, and more permeable by air, water, heat,
and other matters, and, of course, inferior for all the pur-
poses of timber.

Secondly, that it is well known that the common oak in
Italy, where it grows faster than in this country, is com-
paratively of short duration. And that the oak which grows
on the mountains of the Highlands of Scotland is much
harder and closer than any produced in England, though
on these mountains it seldom attains one-tenth part of the size
of English trees. Every country carpenter in Scotland
knows, it is said, the extreme difference between the dura-
tion of Highland and English oak for spakes of wheels.
Many hedge-carpenters in both parts of the country know
the relative duration of transplanted or plantation oaks, that
is, the young oaks which are thinned out from thriving
plantations of this sort, and those from natural forests, when
employed as posts for railing. From different observations
which the writer has made in Monmouthshire and Hereford-
shire, the duration of the oak in these counties, it is thought,
more inferior to what it is in Cumberland and Yorkshire:
that is, it is thought no exaggeration, when it is said that the
difference is as eight to ten. Some timber dealers are known by
the writer, who, in purchasing it, pay attention to the dif-
fERENCE of soil and situation even in the same woods. When
they can find oak in exposed situations and on deep clay soil,
and ash on rocky fleeps, they always give them the preference
in their purchases as timber.

Thirdly; that a known fact is stated by the writer which is
said to be of such importance, that it is trusted, if it does
not satisfy every unprejudiced person in respect to the truth
of the general principles which are wished to be here laid
and explained, it will at least arrest the attention of all
those who are interested in the quality as well as mere bulk
of
of timber: and this, it is thought, may lead to more extensive observations, and perhaps more favourable conclusions relative to it.

The plantations of the timber kind which were made at Kinnaird castle in the years 1750—1790, are, it is said, well known in the north of Scotland. They were chiefly of deciduous trees, among which were generally introduced larches for shelter. These larches, in some places, grow with astonishing rapidity. On many slopes, where the surface-soil was good though not deep, and the sub-soil a sandy gravel, they advanced upwards of five feet a year for the first six or eight years after being put in. As they overtopped and crowded the deciduous trees, they were gradually felled; and as much had been said about the durability of larch-wood, the first trees that were cut down were fawn up, and applied to a purpose: which was perhaps, it is thought, one of the best tells of their durable properties. This purpose was the foot-paths of peach-houses and vineyards, where they were exposed to alternate drought and moisture, heat and cold, and where common deal and other kinds of wood had repeatedly failed. The larch deal of these trees was, it is stated, applied in the same way as the others, and in lefs than two years was completely rotten and destroyed!

It may, it is conceived, be alleged by some, that this could only hold true in regard to the dead, or late formed wood: but the heart, or red central wood which was present, though it lasted longer, did not, it is affirmed, endure three years! The vast number of these trees annually taken down, were afterwards, it is said, chiefly made use of as fuel; and though this wood had been affected not to flame, or be consumed without the assistance of other wood, it did not, in this case, flame violently, but it burned by itself without care or attention, and unassembled from other timber-wood, producing numerous fires for labourer's uses. In rendering it fit for this purpose too, the workmen found it extremely brittle, a tree a foot in diameter being often broken with the greatest ease, by means of two or three blows given with the back of the hatchet. The tops and side-branches of them were likewise remarkably light and brittle, as are known to many pence in that part of the country as well as this. See Timber, Crooked Growth of.

These facts are said to deserve a very serious attention, and to lead to very important conclusions, in respect to the cultivation and growth of this tree as timber in this country. They are not solitary ones: for though, as yet, sufficient time has not elapsed for a fair trial of this wood in different soils and situations, yet some have found it much les durable than others; and that an attentive, nice observer, will, it is thought, perceive larch-trees in some rich warm situations in a decaying state, and others growing so rapidly, or so much side-lobbed or pruned, as to fuggest doubts, whether their duration will be much longer than those of the above castle.

And, fourthly, that in Scotland, the difference of durability between common fir-wood which has been of slow growth, and that which has been forced, as it is termed, either by shelter, advantageous soil, situation, or climate, or by lopping off the side-branches, is known to every carpenter in the more northern parts of it, especially in the districts of Perth, Stirling, and Argyll. There, it is said, they distinguish the wood cut as timber in the native forests, from that obtained in plantations, by calling the former highland-fir, and the latter park-fir. The highland-fir is most esteemed, on account of its greater durability, being frequently found undecayed in ancient buildings when other forts are entirely wasted. These circumstances are strongly supported, it is thought, by Mr. Lambert, who, in speaking of the genus Picea, has said, that "this striking difference between the highland and park fir, is probably to be attributed to the mountainous and rocky situations in which the native timber is found, and where, the trees being of slow growth, the wood is consequently of a harder texture." The same writer is of opinion too, it is said, that few species of pines will endure more than forty years in the soils in which they are commonly set out or planted in England. Indeed, there are many proofs of this, it is thought, from Crock, Kew, and other places; though, there are some excellent fir-trees at Langhangles, where the soil is deep and cold, that are much older than that period. The greater durability of the former fort of fir-timber may be daily seen, it is said, in the still more northern districts of Aberdeen, Banff, and some others, during the removal of old farm-houses and cottages; whereas a piece of the highland-fir appears, it is always of a much deeper yellow than the park or low country fir. At Gogar, it is said, some large fir-trees were taken down in 1795: they grew upon a deep cold loam; the wood was fawn up, and was found of excellent quality as timber. About a mile from this, at Lenny Park, a dry bank is covered with fir-trees of greater age than those of the former situation; some of them have been taken down at different periods before and since that time, and have uniformly been found of inferior quality as timber-wood. In 1804, too, a number of fir-trees were taken down from the rocky banks of the Almond, between Craige Hall and Crumfont House; and they were found of excellent quality in their wood. While at Bevelaw, there are extensive plantations of fir-trees, which have been often thinned; but the trees have grown so fast, and been so much cut or pruned in the branches, that they never last long, it is said, as paling. All these cases have either come under the writer's own particular notice, or that of a relation of his, who highly interests in the value of park-fir, and, of course, has paid a more than common attention to the matter. A great number of other instances might, it is said, be here added, but it is unnecessary: and the comparison of the wood of the common crab, the father of the orchard, with that of the cultivated apple, is in support of the same. Any person who will take the trouble to examine the fir-woods at Gordon Castle, and contrast them with others in the county of Perth, and those in England, will, it is thought, unquestionably come to these conclusions: that growth is essentially necessary to the durability of fir-timber; and that wherever the accumulation of wood has been accelerated by culture of the soil, improvement of the climate, or by cutting and pruning, it is injured in quality in proportion to the ratio in which these agents have been employed. It is not said, that no branches should ever be cut from fir-trees, but that it is certain that judgment must direct to cut off, in general only, such as indicate that they are no longer of much use, which is easily discovered by marks of approaching decay.

Much of the above principles, reasoning, and conclusions, is probably, in some measure, equally applicable to other sorts of timber.

In the raising and growth of timber of the fir or Scots pine kind, it is found not well suited to very elevated situations, as the sharpness of keenness of such exposures bring it too quickly into a state of decay and death. The writer of an agricultural survey of one of the more northern districts of Scotland has remarked, that there is a kind of laminated clay, much disposed to dissolve with water, which is not favourable to the growth of this, or any of the pine tribe. It succeeds very well, it is said, however, in most
moist parts of the clay ground of that tract, if care be taken to prevent flagrant water. It does exceedingly well too on land covering the freestone rock; but that the belt timber of this fort is produced on hard dry gravelly soils. But that the Siberian pine, and some others of a similar nature, have been introduced with very little success. The short intervals of mild weather which happen in the beginning of the spring, excite them to vegetate too early, and the next cold blast destroys the young buds. The New England pine thrives in a tolerable soil, until from twelve to twenty years of age, in proportion to the nature of the exposure, after which it generally begins to decay. And that the spruce is likewise unfit to weather the storm on the greatest heights. It succeeds on the hard dry rock where the Scots pine dies, but frequently decays at the end of eighteen or twenty years, on stiff wet clay. Its most favourite soil for timber is that which is dry and gravelly. The silver fir thrives in clay soils, where the spruce fails; nor is it adverse to the hard rock or gravelly soil, which probably affords the belt timber; but it makes little or no progress on any soil that is very poor. It unfortunately too frequently suffers feverishly from the frosty mists of the spring, especially in its youth, or more early states of growth. However, the larix or larch is now found to be the most hardy alpine plant. In moist places, it makes greater progress than almost any other timber-tree, and there is scarcely any soil, that is not drowned with water, on which it will not succeed. It suffers most in too luxurious situations, where its soft shoots, unable to keep erect, bend away from the slightest gale, and its timber produce is probably the worst. It is liable while young, in some situations, to be much injured or wholly destroyed by early spring frosts taking place after mild weather has brought on its vegetation, and is occasionally feized with disease, and dies when placed on miry clay.

It is suggested that the birch is next to the larch in the progress of its growth, and equal to it in ability to stand the blast in alpine situations; and that it is superior to it in the plain. But in whatever situation it is placed, it delights most in a light soil and dry bottom, probably producing in such the belt timber-wood. It, however, thrives in moist soils, with very moderate draining.

The ash also, when it enjoys a sufficient depth of good soil, is capable of braving the storm, and pulling up its head in the most exposed situations; however, in a thin soil, covering a stiff argillaceous bottom, it can make no progress. It notwithstanding thrives well in some marthy soils, where the banks are steep, so that the water gets away without flagrating. On dry rocky steeples, the timber is probably the best. It forms perhaps the most important wood in the country as timber, being useful in all its ages and states, and fit for most purposes.

The mountain-ash is likewise a hardy native, which grows freely in almost all soils and exposures; but its favourite situation seems to be in hanging banks, among woods and coppices, where the timber-wood is perhaps the best. This and the gean-tree, or wild cherry, raise and propagate themselves much when left at liberty, by putting up or out suckers from their roots.

The beech is said to come near to the ash in capability of braving the storm, and has much the advantage of it in thriving in poor or stiff soils; but there are some barren argillaceous bottoms too much even for the beech; and it is most successful, and affords the belt timber, in friable soils. Its shoots, while young, are soon affected by frost, but the tree speedily recovers.

The fycamore and elm require a light soil, and a dry, open under-fruit; and when this is the case, the timber is the best, and the trees thrive in a situation pretty much exposed. They form good timber too on some soils of a heavier nature.

In regard to the oak, it is less patient of the blast than most of the timber-trees of the forest. Being late in putting forth its leaves, it continues to grow till the season is far advanced; and the immature wood of its late shoots, unable to fulfill the piercing effects of the cold wind in exposed situations, withers before the next spring; so that, like Penelope's web, the progress of one season is undone in the following. The most favourable situations for the oak, as timber or otherwise, are therefore hollows or hugging slopes, where the sharp cutting winds are broken by the neighbouring heights. In such situations, if flagrant moisture be avoided, it will thrive in the stiffest soils, and with its strong roots penetrate the deepest bottoms, affording good timber. Though the growth of this tree be slow in infancy, when it is placed in a favourable situation, it will make a progress in the course of fifty years, little inferior to many other kinds, and at length arrive at a great size of timber. See these timber-trees.

It has been found that the horse chestnut-tree thrives well on the lower grounds, and deep soils only. The sweet chestnut, which quickly becomes a timber-tree in districts more northern than this, does not succeed here. Its feasons of growth are too early, or too late, for the climate. In its height, it bears some resemblance to the Siberian pine, &c.; in its fall, to the oak; its early growths being almost as early as the former, and its later being nearly as late as those of the latter, and still more soft and susceptible of the cold. Hence its shoots are alternately put forth and destroyed, and it generally becomes a low, stunted, shrubby tree. But this, it is said, does not seem to have always been the case. The fate of the common walnut, which may be considered almost as much a timber as a fruit-tree, is nearly the same with that of the sweet chestnut. It probably affords the belt timber on dry friable soils of some depth.

The poplar and most of that tribe delight most in water-formed soils, but are commonly averse to marsh, and, when happily situated, make quicker progress than almost any other sorts of trees, producing much light useful timber. See Chesnut, Walnut, and Poplar.

Management of Timber.—The rules and regulations for the management of fir and other timber-trees, which are given below, deserve attention. Mr. Salmon, of Woburn, in Bedfordshire, who is in favour of much lopping or cutting of the side-branches of fir-timber, remarks, in a late volume of the Transactions of the Society of Arts, &c. that considering the purposes that this sort of timber is commonly applied to, it must occur that clearness of knots, straightness, length, and equality of size of the trunk, constitute its perfection, and that, if deficient in all these, it is of no value but for the fire. Next to these considerations, and the prospect of an improved knowledge of raising and cultivating this kind of timber-wood, it may, it is said, be a fair question, if our own country be not capable of producing this timber little or not at all inferior to foreign fir? In this country at present, fir appears, it is thought, not for any length of time to have been considered much otherwise than as ornamental. For this purpose they sever only for a certain time, which, when past, it has been their fate to be cut down long before having attained maturity. But from the great extent of ground now covered with this sort of timber-tree, it is to be hoped, it is said, that another century may obtain to English fir some of the character of the oak of the fame country: towards such an end, if attainable,
every means should, it is said, be used, and towards which nothing appears more likely to succeed, than a well-grounded general or practical mode of management, from the time of the trees being put out, to their greatest imaginable age of improvement. That a knowledge of such may by perseverance be gained, is not, it is said, much to be doubted, as from different specimens there appears great reason to conclude, that early and proper side-lopping the branches, and thinning out the young trees, will form a considerable feature in the plan and system to be adopted and pursued.

The subjoined plans and rules for the general management in these cases, are given as the partial result of practical experience, but of only a few years' observations.

In the raising of this sort of timber, from every authority and observation, there can be no doubt, it is thought, that all firs should be set out or planted thick or near together, as not more than four or five feet apart. That where firs of the same kind are put out together, there are lfs of fops of plants, too, from one foot not overgrowing and destroying the others; consequently, that it appears advisable that all the different sorts should be set out separately by themselves. If any admixture at all be admitted, the Scotch fir and larch may, perhaps, be set together; but this is not certain, and they will unquestionably be better separate on two accounts. First, because they are not so likely to injure each other; and, Second, because the larch may be put into the foil best suited for it, and the Scotch fir the fame. And that in raising any particular fort extensively, it may be right to have a few of the spruce fort, or others, on the out or exposed sides, to prevent mischief from sudden gults or blasts of wind: but if the situation be not liable to such gults, the spruce had better be omitted, being mechanical agents only, and, by excluding the fum and air, act against the operations of nature. However, in these limits, ornamental is not, it is said, considered, but only timber: if the former be wanted, and profit alto, then the spruce, the larch, the silver, and some other forts, may be combined.

It is contended, that from some years' observations on cutting out and side-lopping the branches, and the efficacies thereof, it appears certain that fir-trees, whenever they arrive at a certain age, should be cut or lopped to a certain height; and that for regulating thereof, the simple rule given below is recommended: the cutting-in to commence when the trees are five years old, or when there is discernible five tier of boughs and the shoot; the three lower tier of boughs are then to be taken off. After the first lopping or cutting-in, the trees to be left alone for four or five years, and then, and at every succeeding four or five years, the cuttings-in to be repeated, till the flam of the tree be clear to forty feet high, after which, as to such side-lopping, it may be left to nature.

The rule for the height of thinning and cutting-in, after the firft time, to be half the extreme height of the tree, until they attain twenty years' growth, and after that time, half the height of the tree, and as many feet more as it is inches in diameter at four feet from the ground. This cutting-out and retrenching the branches of such trees is known, from repeated observations, it is said, not to be excessive; and that the rule is calculated to check the too tapering top, and for strengthening the slender bottom, by carrying the cutting and retrenching to a greater proportionate degree, in a ratio compounded of the height and bottom bulk; and by this rule, too, it may be observed, that the trees will be at top clothed with somewhat less than half their branches. The proper time for such cutting-in as, it is said, between September and April, and the tool to be employed in the busines, the saw.

It is noticed, that orderly thinning the trees at certain periods, when for timber, is the next essential to that of cutting in and lopping their side-branches; and that for this purpose, observations have been made on the most orderly and thriving collections of this sort of trees, and the sub-joined simple rule is laid down: keep the distance of the trees from each other equal to one-fifth of their height. In the application of this rule to this purpose, it is evident that each individual tree can never be made to comply, for the original distance (even if set out in the most regular order) will allow only for certain modifications, by taking out every other tree, and so on; but even if the obtaining such equal distance were practicable, experience would show, it is thought, that another way should be preferred, of which the eye must be the judge, by taking out such trees as are leafy thriving, and near all to other good trees, &c. &c. at the same time keeping in view the rule laid down: the directions and rules for which, given below, may easily be proved, by measuring a chain square, or any quantity of the land, and counting the trees therein; then, by trying the height of two or three trees in that quarter, and taking one-fifth of such for the distance, it would be readily seen how many trees for timber should be contained in the piece measured; or the practice may be more simply regulated, it is said, by taking the distance of eight or ten such trees added together, the average of which should be equal to a fifth of the height of the trees. In these rules and directions there is nothing impracticable or complicated, it is thought.

The writer states, too, that he has for years known the expence and produce of this side-trimming alone, and finds that in Bedfordshire the produce of it doubly repays the charge or cost; and that although some experimenters may differ from him, or time may show some reason for somewhat deviating from his rule, it is presumed all will agree that some simple plan is advisable, instead of having timber collections and woods mismanaged, to the great loss of the community and their proprietors. If such a plan of proceeding, as is here proposed, be generally promulgated, if not perfect, it will most likely, it is thought, in time become so, and thereby have its advantage; and in order to promote this, these concluding remarks are given: in the common course of gardening, it is understood that cutting and trimming invigorate the tree; that taking off the side-branches makes the upright ones shoot the stronger; and by cutting out the dead and decayed wood, the tree is kept alive: some of this doctrine will, it is supposed, certainly apply to the tribe of firs; it will certainly, too, sublimate clean timber-wood for knots; and of this treatment, from their particular uses, they of all other trees stand in most need, and will be the most improved by it. And that should it be admitted that the like treatment would on the fir, as well as other trees, produce the like effect, it would lead to a well-grounded expectation that, as well as producing clearest of knots, straightest, and length, the same operation would advance the quality nearer to that of foreign fir; for it may be traced, that where trees are tall and clear of boughs or knots, the whole sublimate of the wood is better and of finer grain, and that it appears likely that such will always be the case: the reason of which may probably, it is thought, be inferred from the sap having farther to rise and descend, and having no boughs to divert or delay it, the circulation must be more free and rapid, most increase be left in the neighbourhood of the boughs at the top of the tree, and lead on the fides at the lower part, conseqently adding to the length of the head, and rendering more fine each annual increas to the body; thereby producing a close-grained, clean, long, and regular caly-
easy-tapering useful piece of timber, instead of a coarsely-grained, short, sudden-tapering trunk, with a quantity of boughs and knots.

The foregoing rules, directions, and observations, are meant, it is said, to apply to fir-timber only, but to a certain extent they may be applied to other timber; though by no means in the same degree or age. But if had recourse to as far as the first fourteen years of their growth, and then such cutting and side-lopping be altogether omitted, and the thinning out very much increased, any collection of such timber-trees would, it is thought, be rendered much more valuable than if left to nature.

The first of the above writers has, however, already stated, that the general effects of side-cutting or lopping the branches of fir, and probably some other timber-trees, are of a corresponding nature with that of culture; that is, to increase the quantity of timber produce. And that the particular manner in which it does this, is by directing the greater part of the sap, which commonly spreads itself in the side-branches, into the main stem. This, of course, necessarily enlarge that stem in a more than ordinary degree, by increasing the annual layers or circles of wood.

Now if the tree happen to be in a warie foil and climate than those which are natural to it, this will, it is supposed, be of some advantage, as the extra increase of timber will still be of a quality not inferior to what would take place in its natural state; or, in other words, it will agree with that state of quality and quantity of timber which the nature of the species, or sort of tree, admits of being produced. But if the tree be in its natural foil, the annual increased produce of timber occasioned by this cutting or lopping the side-branches, must necessarily injure its quality, in a degree corresponding with the increased quantity. And if the tree be in a better climate and foil than that which is natural to it, and at the same time the annual increase of wood be promoted by such cutting means, it is evident, it is said, that such wood must be of a very indifferent quality from that produced in its natural state.

Consequently, although it might, in some degree, it is supposed, be shown from vegetable anatomy, and the analogy of what takes place in herbaceous vegetables, it is preferred to deduce, from the facts stated above, this proposition: that whatever tends to increase the wood in a greater degree than what is natural to the species or kind when in its natural foil, must injure the quality of timber. Cutting or lopping the side-branches tends to increase this in a considerable degree; and, therefore, it must, it is thought, be a pernicious practice, in so far as it is used in these cases.

It has been shown, it is said, in a very striking manner by Mr. Knight, that timber is produced, or rather that the alburnum, or sap-wood, is rendered ligneous, by the motion of the tree during the deficient of the true sap. It is sufficiently known, too, to all who have attended to the physiology of vegetables, and greatly confirmed by some experiments not long ago communicated to the Royal Society by the same writer; that the solid tissue of the wood greatly depends upon the quantity of sap, which must necessarily defend, and likewise on the flowings of its deficient. Now both these requisites are, it is contended, materially increased by side-shoots or branches, which retain a large quantity of sap, and by their junction with the stem occasion a contraction and twisted direction of the vessels, that obstruct the progress of this juice. That this is true in fact, is well known to those accustomed to make wine from maple or birch trees, as in this business it is found that those trees which have the fewest side-branches, bleed more freely than the others, but during a much shorter pace of time. These hints, consequently, afford additional evidence against the practice of cutting or lopping the side-branches of timber-trees, and especially against that of using it for fir-trees, which, as the above writer justly remarks, it is said, have larger vessels than most others, and therefore, when in an improved foil and climate, side-branches for the above purposes are essentially necessary, if solid, resistant, and durable timber be the object in view.

The following conclusions may, of course, be drawn in respect to the management of timber-trees from the above facts and remarks. First, that timber-trees should be set out in foil, situations, and climates, as much as possible analogous to those of their natural state; and that it is chiefly in this state, or where there are some defects in regard to them, that such cutting or lopping and culture can be exercised with advantage. Secondly, that in proportion to the superiority of the foil, &c. in which trees are put, over the natural foil of such trees; in the same proportion lopping and cultivating the soil ought to be avoided, and thinning encouraged. Thirdly, that particular regard should be had to the soil and situation, where either larches or any of the pine tribe are placed out to remain finally for produce as timber: for as the roots of these chiefly run along the surface, and as in them the great current of the sap is principally confined to one channel, that is, the trunk, and the tribe of trees is, of course, peculiarly liable to change when subjected to unnatural agency of these kinds. Fourthly, that the only way in which oak-timber of safe quality can be raised and provided for the navy of this country, is by inclining, preferring from cattle, and properly managing, those royal forests where oak is the natural produce of the foil. The neglect of this advice, there is reason to fear, it is said, may at some future day be regretted. For park-oak, as has been seen, is by no means unfrequently much inferior to that of the forest kind in durability. And that, lastly, as the advice advised tends to render trees characteristic of their peculiar species or kind, it must consequently be the most agreeable to ornament too, or the principles of natural taste.

The necessity of considering, thus fully, this branch of the management of timber-trees is; because the matter feems, it is said, to have been almost entirely overlooked by practical men, who, appears, in general, to think culture and lopping, or cutting-in, of no other utility than to increase the produce in the quantity of timber. Though they are not, however, to be discarded in many other views, yet if solid and durable timber be the object, they ought, it is thought, to be had recourse to with caution, and in a discriminative manner. As a contrary plan of proceeding has been attempted to be enforced by some, as has been seen, it is thought necessary to arouse the attention of the country to the raising and improved management of the important article of timber, especially as the confquences of that plan are supposed to be more dangerous, as they cannot easily discover themselves until it be too late to apply a remedy.

In the management of timber-trees of the deciduous kinds, the lopping, cutting-in, and thinning, should be practised, in some measure, on the same principles as the above, but according to the particular nature, circumstances, and habits of growth of the different sorts; being constantly executed in such a manner, as to prevent any injury or inconvenience arising by the too extensive growth of the lateral shoots or branches, these being too few in number for the proper retention of the sap; and without the trees being left at too great a distance, and too naked and exposed. The trees for timber too are always to be kept clear of all foul wood, and any branches to be removed, taken off in a clean, careful, up-ward
T IM E R.

ward direction, as where the parts are left in any way rugged or uneven, they are liable to catch and detain the wet and moisture, and conduct it to the hearts of the trees, by which they are not only greatly hurt in their growths, but often much spoiled as timber-wood. The thinning of the trees for timber should be performed at different suitable periods, so as to prevent too much crowding, and afford proper room for the full growth and increase of their wood, on the principles laid down above. See Pruning and Thinning.

Sir Humphrey Davy has remarked in a late work, that trees poising the firmeat and the leafy porous heart-wood, are the longest in duration. That, in general, the quantity of charcoal afforded by woods, offers a tolerably accurate indication of their durability: these most abundant in charcoal and earthy matter are most permanent; and those that contain the largest proportion of galeous elements are the most destructible. That, amongst our own trees, the chestnut and the oak are pre-eminent as to durability; and the chestnut affords rather more carbonaceous matter than the oak. That, in old Gothic buildings, these woods have been sometimes mistaken one for the other; but they may be easily known by this circumstance, that the pores in the albumen of the oak are much larger and more thickly set, and are easily distinguished: whilst the pores in the chestnut require glaftics to be seen distinctly. That, in consequence of the flow decay of the heart-wood of the oak and the chestnut, these trees, under favourable circumstances, attain an age, it is said, which cannot be much short of a thousand years. The beech, the ash, and the fycamore, most likely, never live half so long.

It is noticed too, that the oak and chestnut decay much sooner in a moist situation than in a dry sandy soil; and that their timber is less firm. The sap-veins, in such cafes, are more expanded, though less nourishing matter is carried into them; and the general texture of the formations of wood necerallarly less firm. Such wood, it is said, splits more easily, and is more liable to be affected by variations in the state of the atmosphere.

The same trees, in general, are likewise much longer lived in the northern than in the southern climates. The reason of which seems to be, it is thought, that all fermentation and decomposition are checked by cold; and that at very low temperatures, both animal and vegetable matters altogether reft pufetration: and in the northern winter, not only vegetable life, but likewise vegetable decay muft be at a stand.

The antiputrefcent quality of cold climates is, it is said, fully illustrated in the instances of the rhinoceros and mammoth lately found in Siberia entire, beneath the frozen soil, in which they most probably have exilled from the time of the deluge.

Trees that grow in situations much exposed to winds, have harder and firmer wood than such as are considerably sheltered. The dense sap is determined, by the agitation of the smaller branches, to the trunk and large branches; where the new albumen formed is consequently thicke and firm: such trees abound in the crooked limbs fitted for forming knee-timber, which is necessary for joining the decks and the fides of ships. The gales in elevated situations gradually act so as to give the tree the form best calculated to refit their effects. And the mountain oak rifes robust and sturdily; fixed firmly in the soil, and able to oppose the full force of the tempest.

Different plates of timber are chosen for different uses, but the above writer remarks, that ship-builders prefer for their purposes that kind of oak-timber afforded by trees that have had their bark stripped off in the spring, and which have been cut in the autumn or winter following. The reason of the superiority of this timber is, it is thought, that the concrete sap is expanded in the spring in the sprouting of the leaf; and the circulation being destroyed, it is not formed anew: and the wood, having its pores free from faceharine matter, is less liable to undergo fermentation from the action of moisiture and air.

It must, however, be considered as very extraordinary, that in a country where the navy is a matter of such vital importance, and in districts where the oak, or other forts of timber-wood useful for the same purpose, may be said to be almost staple articles, no complete or satisfactory trials should have yet been made of the means of increasing the duration of such timber, which are mostly fo readily practicable, and so very material in their consequences.

Felling of Timber.—The proper periods or times of cutting down, or making falls of timber, as they are often called, must evidently, in some measure, depend upon and be regulated by the nature and the differences in the circumstances of the growths of the same or different kinds of trees. But as in them, as well as other living matters, there seem to be three stages of growth; as that of their early rising, their middle mature state, and that of their decline or decay; they may serve as more satisfactory guides in the business. In the first, the growth is mostly soft and rapid; in the second, it becomes firm, strong, and perfect; and in the last, it begins to become weak and unfoold. Mr. Loudon has considered the beginning of the middlemost of these stages as the most profitable period or season for felling of timber; as after that time, though the tree may appear found and healthy, its annual increase is so little, that the cutting it down and replacing it may be more beneficial than letting it remain. The number of years that a tree may stand before it arrives at such a flate, mutt, it is said, vary in different soils, situations, and exposures; but the period itself may readily and without difficulty be ascertained,—by the annual shows, the flate of the bark, and by taking the circumference of the tree at the same place for two or three successive seians, and comparing the difference. In the view of profit from timber produce, it is of material consequence, it is said, to cut down such collections of trees at maturity, or in their vigour and perfection, which, from supposo, for the oak, where the foil is natural, is from about the age of fifty to sixty or seventy years' growth. Many trees will stand a half, others a whole century after they are full grown, appear quite healthy, and, at the same time, make little or no increase of timber. There are particular cafes too, depending on the nature and state of the markets, in which it may even be more profitable to cut timber before it is arrived at a full growth than afterwards.

It may be difficult, it is thought, to say when timber, which is principally planted for ornament, should be cut down. A tree, when young and fresh, is beautiful; when middle-aged, it is more or less picturesque; when in old age, strikingly so, with a degree of grandeur; and its greatest height of picturesque and sublimity, is when decaying under the pressure of age. Hence it is conceived, that if ornament, or expression, which is a more appropriate term, were the sole object in view, trees need almost never be cut down. But most perfons have a feeling of what is beautiful; and though all may be fruck with grandeur or sublimity, few have so much enthusiasm as to sacrifice the profit of valuable timber, for the pleasure of enjoying either of those characters.

The time and manner of cutting underwood and underground will be seen under these heads.

There are perfons in this country, who, unquestionably from
TIMBER.

from neglect and mismanagement of their timber, are now, it is said, losing annually very handsome incomes. The lots of price which generally follows the refusal of a good or high offer, the certain lots of interest, the decay of timber, and the injuries arising from the incumbrance of full-grown trees, are irretrievable losses, which those who have the care and management of timber should studiously endeavour to avoid. But while the disadvantages of suffering timber to stand until it be overgrown are thus held out, it is far from proper or advisable to propose or favour the premature felling of it.

The season of the year for this work usually commences about the end of April; because the sap then rises, which makes the bark run freely, as it is technically termed; that is, it drains off the trees freely; so that where a quantity of timber for ordinary uses is to be felled, that statute I. c. 22. formerly required it to be done between the 1st of April and the last of June, for the advantage of taming; but this act was repealed by 48 Geo. III.

However, the opinions and practices of authors are very different as to the best season for felling timber: Vitruvius recommends an autumnal fall; others advise December and January: Cato was of opinion, that trees should have borne their fruit before felling; at least, that their fruit should be first ripe; which coincides with the sentiments of Vitruvius.

In effect, though timber unbarked be most obnoxious to worms, yet we find the wild oak, and many other kinds, if felled too late, when the sap begins to be full, to be very subject to worms; whereas about mid-winter, it neither calls rifts, nor twines. If trees were felled at a more early season than April, it is said that the timber would be better seasoned.

It is, indeed, the common opinion, that timber which is felled in winter, is stronger, and more lasting, as being more firm and clove, than that which is felled in summer. But M. Leuwenheuck apprehends that there is no difference, except in the bark, and outermost ring of the wood, which in the summer are fester, and more easily pierced by the worm: wood confining of hollow pipes, which, both in summer and winter, are full of moisture, and do not shrink in winter; and therefore the wood cannot be closer at one time than another, for if otherwise, it would be full of cracks and clefts. The unexpected and sudden rotting of some timber, he conceives to proceed from some inward decay in the tree before it was felled: having observed all trees to begin to decay at first in the midspring or heart of the tree. Phil. Trans. No. 215. or Abr. vol. i. p. 592.

The ancients had a great regard to the age of the moon in the felling of their timber. If their rules availed, they are these: fell timber in the wane, or four days after new moon; some say, let it be the half quarter. Pliny orders it to be in the very article of the change, which happens on the last day of the winter solstice, the timber, says he, will be immortal: Columella says, from the twentieth to the twenty-eighth day: Cato, four days after the full: Vegetius, from the fifteenth to the twenty-fifth, for ship-timber; but never in the increase, trees then most abounding with moisture, the only source of putrefaction.

Some even have a regard to the temper and time of the day; the wind to be low, neither east nor west, neither in froat, wet, nor dewy weather, and finally, never in the forenoon.

Laudy, some regard is had to the species: fir is best felled when it begins to spring, both as it then quits its cost belf, and as the wood, according to Theophrastus, is by that means rendered wonderfully durable in water. Elan, says Mr. Workidge, is to be felled between November and Ja-

mmary, in which case it will be all heart, at least the sap will be very inconsiderable: this, he adds, is also the only good season for felling ash. Some authors add farther, that in felling timber, care should be taken, first, only to cut it into the heart, and so to let it stand till dry; by which means the moisiture is evaporated in drops, which would otherwise occasion putrefaction.

M. de Buffon observes, as a circumstance which greatly increases the strength and solidity of timber, that the trees intended to be felled for service, should first be striped round of their bark, and suffer to stand till dry upon the spot before the cutting. The fappy part, or blea of the oak, becomes by this management as hard and firm as the heart, and the real strength and density of the wood has been proved by many experiments to be greatly increased by it: nor is this practice detrimental to the proprietor, because the remaining stumps of these trees send up their young shoots as vigorously, as if they had been cut down in their natural condition. Mem. de l'Acad. Sc. Par. 1739.

When any tree is to be cut down for timber, the first thing to be taken care of is a skilful disbranching such limbs as may injure it in its fall. In felling the tree, it should always be cut as close to the ground as possible, unless it is intended to be grubbed up and this will be of advantage both to the timber and the wood; for timber is never so much valued, if it be known to grow out of old stumps.

There are several different modes made use of in felling or taking down timber, and they must necessarily be somewhat various, according to the nature, extent, and kind, of which the collection may be, as well as in the methods of performing the work: thus, in groves of the deciduous timber kind, the trees are mostly felled felled by gradually taking or thinning them out as they arrive at maturity; which, where they are to be continued, should be cut over by the surface of the ground, and the stumps be each separally well felled in, that by defending them from cattle, new trees may be produced; but when not deftined to be continued, they may at once be rooted out. Groves of the fir or pine fort, or any single fir-tree of any kind, should at once be taken out by the roots. In woods, any timber-trees that may be cut down, should have their places as nearly as possible supplied by fappings, or any other proper forts of young timber-trees. However, previous to the work of felling, the trees should be marked by a proper person; in performing which, in a fall of timber, regard is to be had to the relative state of standing in the trees. In clove timber-woods, the whole or nearly the whole may be marked and taken down; as if some which appear flourishing be left standing, they will not only be liable and in danger of being hurt in taking the others down; but, in consequence of their situation in regard to exposure being changed, will no longer continue to flourish. As their atmosphere is not only thus altered, and rendered too cool, perhaps, for their acquired habit, by the removal of the adjoining trees; but they thereby get room to throw out fiddle-shoots from their stumps; in consequence of which their tops die, and their growth is irrecoverably stinted. While, on the contrary, in open woods of the same kind, thin hedge-rows, and other open spaces, such timber-trees only as are ripe for the axe, or are suitable for the intended purpose, should be marked; the youthful growing trees being left to be benefited most probably by an increase of air and head room, in an atmosphere and exposure to which they are habituated and accustomed. On estates that are timbered, it is directed that they should be frequently gone over by proper persons, who, let the price and demand for timber be what they may, should mark every tree which
TIMBER.

waters the appearance of decay. Where the demand is brisk and the price high, he should go two steps further, and mark not only such as are full grown, but such also as are near perfection; for the interest of the money, the discernment of the approaching young timbers, and the comparative advantages of a good market, are not to be bartered for any increas of timber which can reasonably be expected from trees in the last stage of their growth.

In the work of felling timber, three distinct methods are practised and had recourse to in different cases: as, first, that of cutting the trees above ground: severing them from their roots, by means of the axe or the saw; leaving what are termed floods, to occupy the spots where they stood. Second, that of cutting them, within the ground, with the axe and mattock; but leaving the principal part of the roots in the soil. And third, that of grubbing them up by the roots, by the use of the spade and mattock; thus throwing them down with the butts and large roots adhering to the stumps. The preference to be given to one or other of the two first modes of taking down timber-trees, is, it is said, chiefly on the nature of the future application of the land upon which they grow. If it be intended to remain in the state of woodland, the first method, or the second, if too much of the main roots be not cut away, is the best and most eligible. But if the land is to be cleared for the purposes of agriculture, where sufficient hands can be had for dispatching the busines, the second is, by far, the best. The last is improper in most cases.

The writer of the rural economy of the midland district, sees, that there the methods of focking, axe-grubbing, and axe-falling are practised. That the first is a kind of partial grubbing, in which the roots are cut through a foot or more from the stem; and, again, a foot or more from the inner cutting; taking up a short length of the thickest part of the roots, and digging a trench round the tree, wide enough to come at the downward roots. That the second, or axe-grubbing, is somewhat similar to the mode of grub-felling described below, except that the end of the butt is left larger in these places than in that case. And that the third, or axe-falling, is the common method of Yorkshire, and other places, of cutting off above ground, with the axe; a method which is seldom practised, except in some few cases where another crop of timber, or of coppice-wood, is designed to be taken. Stocking is the prevailing mode;—the charge for taking down varying with the size of the tree: for a tree of two feet in diameter, it is about a shilling; and about four pence more for cutting off the butt; the focking and butting being, for the most part, left together. Other modes, too, are practised in other districts in performing the busines; as that of fawing the trees off in an horizontal manner close by the surface of the ground, by means of a long faw with one or both handles fixed on the upper side, the trees being firt dipped in by the axe on the faling side.

The method of felling timber practised in the county of Norfolk, is said, by the same writer, to be uniform, and perhaps peculiar to the county. It is very aptly called grub-felling; the operation partaking both of grubbing and of felling with the axe, in the common way above ground; a method which is walleful of timber. The woodman of this district, therefore, fells below the surface of the ground, by cutting off the horizontal roots close to the stem, which, instead of shortening, he, in effect, lengthens, by adding to it a conical point, cut out of the crown of the root; so that by this way of proceeding, a greater length of timber is obtained, than by first grubbing and afterwards cutting off the butt with a faw. Grub-felling is, it is thought, without doubt, the most eligible way of taking down hedge-row timber; and this, it is supposed, accounts for its being the established practice in the above county.

The disposal of timber, which often takes place before it is cut down, is to be regulated by the occasion of it, as arising from the sale of the timber, or other causes and circum- stances. It is, however, for the proper and beneficial sale and cut it down before its most profitable state of growth is reached; though this principle may sometimes be set aside by particular circumstances, as the nature of a market; the value of the land it encumbers by its growth, being greater than its annual increase; the interest of the money it is worth, with that of the growth from the floods, being greater than the increase of the standing timber, &c.

It is conseqently rarely advantageous to suffer timber to remain upon its roots, after it has attained its full growth;—as, in this cafe, the whole of the interest is lost, it is said, to the owner; while the use of one of the most valuable articles of the produce of the country is lost to it and the whole community.

In speaking of oak-timber, the late bishop of Landaff has given some useful and interesting remarks in regard to the disposal of it, in the introduction to the Agricultural Report of the State of the County of Wellington. Where profit is considered, it is said every tree should be cut down and sold, when the annual increase in value of the tree by its growth, is less than the annual interest of the money it would fall for. This being admitted, it is only necessary to inquire into the annual increase in the value of oaks of different ages. After different statements, thirty-six shillings each are fixed upon as the price of trees that should be cut down and sold; as, if they be cut down before they arrive at that value, or if they be allowed to remain until they will fall for a much higher price, the proprietor of the soil or land on which they grow will be a looser. It is noticed too, as being the general opinion, that it is more profitable to fell and fell oak-wood at fifty or fifty years' growth, than to let it stand for newy timber to eighty or a hundred, owing to the low price that is now paid for oak-trees of large dimensions, either by the Navy Board or the East India Company. On this account, it is advised making a much greater increase of price than ordinary on timber of this sort of large common, as in place of four or five pounds the load, if eight or nine were given for trees containing one hundred cubic feet and upwards, every perfon in the kingdom, it is thought, would have a reasonable motive for letting his timber stand until it became of a size fit for the use of the navy; whereas, according to the present established price, it is every one's interest to cut down and fell their trees before they arrive at a proper size to be useful as navy timber. This suggests, too, the necessity of attending to the royal forests in a more particular manner; and may be an additional inducement to the trying the cultivation and growth of the larch in them, and training it for ship-timber. See TIMBER, Crooked Growth of.

There are several different modes of disposing of timber, according to the nature of it, the situation, and the customs of the districts to which it belongs; but the principal of them are, first, that of selling the trees standing; either by auction, by receiving written proposals, or by bargain and sale: second, cutting the trees down, and selling them in the rough; by any of the above modes; third, converting the fallen trees; that is, cutting them up into wares to which they are best adapted, or which are most salable in the particular situation. On a large timbered estate, the first mode
is, in common, the most advicable to be had recourse to; in which case, an accurate valuation of the marked trees is to be made, before they are offered for sale: and, in the case of oak timber-wood, it is mostly proper, and always satisfactory, to have separate valuations of the timber and the bark.

In felling timber in the county of Norfolk, the prevailing practice is, according to the writer of the rural economy of that district, to fell it standing, at so much a ton when fallen; measuring the timber down to fix inches timber girt; the topwood and the bark (of oak) becoming the property of the purchaser; who is usually at the expense of taking it down. And it is customary there, too, for the purchaser to dispose of the bark (of oak), and sometimes the topwood, by the same admeasurement.

In the midland districts, after disposing of and cutting out the timber, the arms or boughs of the trees are cut up into posts, rails, and cord-wood for charcoal; the sprays being mostly made up into faggots.

The relative value of different sorts of timber may be said to depend almost wholly upon local circumstances, as those of contiguity and facility of being taken to the places where they are the most largely made use of, or where only employed. Some sorts are, however, everywhere valuable on account of either their general application, or their scarcity, such as the oak, the ash, the elm, the beech, and the still more valuable larch, and others of the firrt description: and of the latter, the common chestnat, the yew, the box, and the holly. The light products of different kinds, afforded by some timber-trees, are also of great use and value in mfull places.

Hunter, in his "Evelyn's Sylva," has justly remarked, that every person who can measure timber, thinks himself qualified to value standing trees; but that such men are often deceived in their estimates. That it is the perfect knowledge of the application of the different shaped trees that enables a man to be correct in such valuations. That a foot of wood may be of little importance to one trade, but of great value to another. This is the grand secret, it is thought, which enriches the purchasers of standing timber.

On the whole, the great and constant demand for timber, on account of the increasing scarcity of it, should induce the proprietors of lands which are proper and suitable for it, to attend as much as is possible to the raising and providing of this great object of rural economy, and national as well as individual wealth.

_Timber, Hardening of._ See Hardening of Timber, and Seafoning of Timber.

_Timber, Seafoning of._ A term used to express the preparing of timber after it is felled, for cutting and working up for use.

As soon as felled, it should be laid up in some dry airy place, but out of the reach of too much wind or sun, which, when in excess, will subject it to crack and fly. It is not to be fet upright, but laid along, one tree upon another, only with some short blocks between, to give it the better airing, and prevent its becoming mouldy, which will rot the surface, and produce mushrooms on it. Some persons daub the trees all over with cow-dung, which occasions their drying equally, and prevents their cracking, as they are otherwise very apt to do.

Some recommend the burying of timber in the earth, as the best of all ways of seafoning it; and others have found it a fine preservative to bury their timber under the wheat in their granaries; but this cannot be made a general practice.

In Norway, they seafon their deal planks, by laying them in salt-water for three or four days, when new fawed, and then drying them in the sun; this is found a great advantage to them; but neither this, nor any thing else, can prevent their shrinking. And it has been recommended to lay boards, planks, &c. in some pool or running stream for a few days, to extract the sap from them, and afterwards to dry them in the sun or air; by this means, it is said, they will be preserved from chopping, casing, or clearing; but against shrinking there is no remedy. Mr. Evelyn particularly recommends this method for fir. See Hardening of Timber.

The seafoning of timber by fire is the best way of all, for piles and other pieces that are to stand under the earth, or water. The Venetians first found out this method, and the way by which they do it is this: they put the piece to be seafoned into a strong and violent flame; in this they continually turn it round by means of an engine, and take it out when it is every way covered with a black coaly crust; by this means the internal part of the wood is so hardened, that neither earth nor water can damage it for a long time afterwards. This method is practised in many places for seafoning the polls for paling of parks, &c. and has this to recommend it, that in the very oldst ruins we have ever been acquainted with, there have been discovered many times pieces of charcoal, all of which have been found uninjured, though buried in the earth for ever fo many ages. This method of seafoning timber is practised in many parts of England, and has been much recommended, both as to economy and effect.

For this purpose, all that is necessary is to light a fire upon the ground, which shall be surrounded with a wall built with loose bricks or stones, and then, when the pieces of timber are laid across the walls, to turn them round carefully so as to present every part to the action of the fire in succession, and when the whole surface, to the depth of three quarters of an inch or an inch, is converted to charcoal, they will be sufficiently prepared. While burning, they should have a temporary covering of boughs or other fuel to prevent them from the action of the atmosphere, which would be apt to convert part of the wood into ashes. See Parke's Essays, vol. ii. See also Charring of Polls.

An ingenious friend of the editor objects to this practice. The opinion that paint is a preservative of wood is almost universal. Nevertheless, we shall now it to be not only erroneous, but that in most cases the use of paint accelerates the destruction of every species of wood to which it is applied.

The decay of wood is occasioned by internal, not external moisture, and this only when it becomes flagrant. As long as there is a free circulation, no decay takes place. Stop the circulation, and if there be any moisture whatever in the wood, flagnation commences, putrefection ensues, and the destruction will proceed with an activity in proportion to the quantity and close confinement of the internal moisture. When wood is thoroughly painted on every side, it is evident that the moisture within it is completely sealed up, and which necessarily becoming flagrant, the decomposition and decay of the timber immediately commence. Hence it is clear, that painting of wood, as above stated, in every case, except only when it is entirely free from moisture, or as it is called thoroughly seafoned, must be as effectual a method as any that can be devised for accelerating its decay.

Wood that is painted only on one side, will, ceteris paribus, last as long again as that which is painted on both sides. And that which is not painted at all will be most durable. Experiment will prove this to be the fact, whether the wood is exposed to the weather or not.
It is seldom that we meet with either a scaffold-pole or a scaffold-board (such as are used by builders) that is rotten, although they are of fir, and are alternately wet and dry, and defend from father to son for several generations. The reason is, they are never painted.

Examine any old building, and it will be found that no part of the wood or timber is in a found state, excepting that which has escaped the painter's brush. The wainscot, doors, windows, &c. will be found to be rotten, when the floors and timbers, although alternately wet and dry from peripherical washing, are perfectly sound, because they have never been painted.

It is a common practice in London to cover the bafe- ment floors with painted oil-cloth; and it is allowing to see how soon, in these cafes, the floors are rotten, and which is called the dry rot, but which is never once suspected to be the slippage of circulation by the use of the oil-cloth. Were carpets substituted for the painted cloths, no such effect would take place.

The dry rot in buildings, and particularly in the nay, is comparatively a modern disease, and has very much increased since the pernicious practice of painting has become so general. The ancient city of Chester, where so much timber was introduced into the outides of the buildings, and which is now black with age, but never painted, is a striking illustration of this theory. The fame may be remarked of the villages at a distance from the metropolis, where the outide wood-work of the buildings, such as doors, windows, window-shutters, weather-boarding, &c. which have never been painted, are nevertheless found, and yet some of them so ancient as to defy all enquiry as to their age. How different this from the gentlemen's houses near London or other great towns, where the gates, posts, rails, and palfisades are kept constantly well painted, but are seldom found to last longer than ten or a dozen years at all.

Paint indeed conceals from the eye the destruction which it occasions; and our readers will doubtles by this time begin to suspect their former opinions of it to be erroneous. We shall therefore only mention two other instances, which came under our own observation, to shew that wood never ought to be painted, except for the purpose of ornament.

A few years ago, some old houses were pulled down near the Monument in London. Several of the principal timbers were so forchored and burnt on the outide, that an enquiry took place as to the cause of it; and it was clearly ascertained, that the timbers in question must have been preserved from the ruins of the great fire of London in 1666, so that this wood must now be much more than 150 years old; yet the writer of this article lately saw that same fir-timber sawed out into deals, and again used as new stuff, being to all appearance as found as ever. The only perceptible difference was in the colour, which was darker than deals generally are.

The other instance referred to is the late old Jewry chapel in London. When that building was taken down, the pewsh, which were of oak, and the seats, which were deal (but never had been painted) were found to be in no perfect a state of foundness, that they were removed to the new building in Jewin-street, and where there is no doubt they will remain as long as the building itself, although these paid deal seats are known to be considerably more than one hundred years old.

The most effectual method of preserving timber from decay is to char it; but when the purpose to which it is to be applied will not admit of that operation, the next best method is to wash it over with charcoal and water, similar to white-washing. Either of these methods will certainly preserve it from the dry rot, charcoal being the greatest antiputrefcent known, and no moisture within the influence of its action will become putrid or decomposed, and we have already shewn that this must take place before wood will perish. It may be further observed, that vegetation cannot take place where charcoal or charring is used, and the dry rot is always accompanied with that species of vegetation called fungi, and this fungus never occurs till decomposition or decay has begun.

When boarded floors are to be laid upon or very near the ground, it should be fiowed over with dry ashes, and the joints and underside of the boards either charred or painted over with charcoal-wash, as before directed. The same should be done with the side of the wainscot next the walls.

As painting is indelispensable from the fashion of the times, to doors, window-shutters, wainscot, &c. it would be well to have them painted once over in the carpenter's shop when the stuff is perfectly dry, and finished afterward in the building for which they are prepared.

If the best feafoned stuff be put up unpainted in a new building, the quantity of moisture it will imbibe from the brick-work, plaffter, &c. before it can be painted, will defeat all former care of well feaoning.

As to fiawes, mahogany is unquestionably the cheapest article they can be made of; for deal, when painted only a few times, will have cost more than the difference of price of that very superior wood, both as to look and durability. Air that is stagnant is equally pernicious as stagnant moisture. When it is in that state, it soon becomes decomposed, and the hydrogen gas fixing upon wood, ropes, paper, and other vegetable substances, quickly brings on their destruction. Ventilation, and the use of charcoal, are the best preventives.

The above hints will be sufficient to guide the intelligent workman in all other cafes.

Though it does not properly belong to this article, it may not be amiss to mention, that these observations are quite inapplicable to the preservation of iron. Iron decays from the effect of external moisture, and the action of the atmosphere upon its surface, which produces oxidation, and which is the sole cause of its decay. This is only to be prevented by painting.

TIMBER, Preferving of. When boards, &c. are dried, seafoned, and fixed in their places, care is to be taken to defend and preferv them; to which the smearing of them with linseed-oil, tar, or the like oleaginous matter, contributes very much.

The ancients advise the smoke-drying of all instruments made of wood, by hanging them up in the chimneys where wood-fires are used. The whole benefit arising from this seems to be, that the oil of the burst wood enters, as it ascends in the smoke, into the pores of that which is proposed to be preferved.

The Dutch prefer their gates, portcullices, drawbridges, flaver, &c. by coating them over with a mixture of pitch and tar, on which they strew small pieces of cockle and other shells, beaten almost to powder, and mixed with sea-fand, which encrusts and arms them wonderfully against all assaults of wind and weather.

Timber felled before the sap is perfectly at rest, is very subject to the worms; to prevent or cure which, Mr. Evelyn gives us the following secret, as most approved: Put common sulphur into a cucurbit, with as much aquafortis
three
strength, the fte was as glafs, as marble, few to It careful in any faid, naval with larger is and, is more and, is would, is more

TIMBER.

as will cover it three fingers deep; diftil it to a drynes, and let it have two or three rectifications.

Lay the sulphur remaining at bottom on a marble, or in a glafs, and, with the oil it diffolves into, anoint the timber.

This, he adds, not only infallibly prevents or cures the worminefs, but preserves all kinds of woods, and even many other things, as ropes, nets, and masts, from putrefaftion, either in air, water, or snow.

For fuch as would go a shorter way to work, two or three anointings with linfed-oil may do very well.

As to the chaps, or elefts, green timber is liable to after working, and which is a very great defect in many fine buildings, they are clofed by anointing, fuppilng, and foaking it with the fat of beef-broth, twice or thrice repeated.—Some carpenters ufe greafe and faw-duft mingled for the fame purpofe. But the former method is excellent. Mortimer’s Husbandry, vol. ii. p. 104.

TIMBER, Strength of: See STRENGTH OF MATERIALS, and BEAM.

TIMBER, Crooked, Growth of; the means of raisiog and providing bent or twifted timber of different forts for the purpofe of ship-building and many other ufls. It has been noticed by Mr. London, that the form of the larch timber-tree is unufual for fome of the purpofes of naval architecture; and that to render it more proper and fuitable for fuch ufls, cutting or pruning it has been advised by some; and, what is still lefs practicable, shading it, by others: but that when its mode of growth is well confidered, it will be found that neither of thefe methods would prove eficual. The Former could not fucceed, it is fuppofed, because in the larch and fir-tribe one fem conftantly takes the lead; and that in this fem alone is contained the timber. The latter, or shade, might, it is thought, produce a crooked enough fem; but that in regard to strength, or timber produce, it would evidently be fo deficient, as to be totally unfit for naval architecture. In confequence of which, he has recommended the plan of bending the young trees as preferable to every other practice; and as this mode may, at fome future period, perhaps be deemed of public importance, he has given a few remarks concerning the method that should be adopted and employed in the buftinefs.

It is faid that, in the firft place, fuppoing a timber plantaftion or wood to be planted in regular rows, fifteen feet apart, and the fame distance in the row; and grown from fifteen to twenty years; in bending or rendering the trees crooked, begin with the firft row, and let every other tree be bent down in different degrees, and tied to the intermediate ones which remain erect, or be faftened to the ground. After the trees have had the growth of seven or eight years longer in that situation or position, they may be bent backwards, fo as to have somewhat the form of the letter S, the tops or leading shoots rising directly upwards again from the upper bents, and the bent trees be either tied to themfelves between the bent parts, to keep them in their proper bent position, or to the trees on the fides, or to any of the trees which surround them, as may be found to be most convenient and necessary. When the ropes have held the trees in these situations or positions for a few more years, they will have received, and retained, in fome meafe, the above crooked appearance; which is a form that will afford knee and other pieces, which are of great ufe in ship-building, and which always, it is faid, bear a higher price than any other form of even oak-timber. Some trees need, however, it is thought, only be bent gently on one fide, and others a little more fo. This variation in the inclination of the trees, with thofe which fhould be left erect, would, it is fuppofed, ferve to produce and afford proper shelter for the whole timber plantations to which they might belong, according to the ules or purpofes for which they are intended, or to the form which is moft in demand. This plan is certainly thought worthy of a trial; and there is no great reafon to doubt its succiff; for the practice of bending trees is not new; as it was advised by Evelyn, and practiced by the Romans in Virgil’s time.

It is probable, too, that fome other forts of timber-trees may be grown in this way with advantage.

It is fuggcfted, that in planting the larch for this, or any other purpofe, a careful attention fhould be had to the choice of a proper foil, as when the tree is in one which is not too rich, it reaches a large fize, and soon arrives at maturity; and that it is obvious, that if the above method were adopted, the timber would be fit for building the largest ships fifty years after it was planted, and for building smaller vessels much sooner. And that there is abundant evidence, that it would grow to a sufficient fize for this ufe in all the mountaneous parts of the ifland; moreover, that the experiments which have been made by Mr. Knight, on the fap and wood of trees, as well as common observation, prove, that the circumstance of bending, especially in an open exposure, would produce a much thicker trunk and a larger quantity of timber, in a given time, than a ftrait tree. These circumftances, in conneftion with the valuable qualities of this tree as ship-timber, and the growing fecacy of that article in this country, lead the writer to fuggcft the propriety of devoting fome extent of the national forests to the cultivation and rafting of the larch as timber, either bent in different ways, or even allowed to take its natural form; as the firft cofl of planting and fencing in, even for five hundred acres, would not exceed 1000l., and the yearly expences afterwards would be but a mere trifle. The culture of the oak, and perhaps fome other timber-trees, fhould not, however, be neglected in the smallest degree: but when it is considered that this tree takes two or three hundred years to come to perfection, and the larch not above half a cenfury, reflecting at the fame time on the approaching fecacy of oak-timber fit for the navy, these hints and remarks may not, it is thought, be unworthy of the attention of the legislature, or from other quarters. See TIMBER and TREE.

The excellent properties of larch-timber, for the ufe of the navy, have been noticed by many, as those of refifting different dangerous effefts. Anderson, in his Catalogue of Trees, afferts, it is faid, that it does not fly in splinters by the impulfe of a ball in an engagement; that no force of heat makes it flame; but that when thrown into a strong fire it consumes imperceptibly. How many accidents then, it is asked, might be prevented by a greater ufe of this timber, if applied in ships? Many lives are loft by the splinters of oak in naval warfare: all these would be faved to the flate by having the planks of war-ships made of it. Decks of the fame materials would refift fire, either accidental or defigned; for although burning materials in time will force their way through a plank of larch, yet it never would spread to the adjoining plank. To be in a ship on fire at sea, is certainly, it is faid, the moft dreadful situation in which any perfon can be placed: every exertion, therefore, to prevent fuch calamity, is the duty of all well-wifers of their country. Beside thefe advantages arising from the ufe of the larch as timber, there is another of no small importance to a warlike and commercial nation, the saving of expence in ship-building; as by experience it is found that it lasts longer than oak under water, and worms will not touch it. Sailors are faid indeed to put larch chips among their clothes; which are found by experience to prevent vermin,
vermin, mould, &c. Consequendy, in place of renewing ships of war every twenty or thirty years, their existence may, it is thought, be lengthened to thirfe that time.

Many other interesting circumstances and facts in support of these statements may also be met with in Newton's Vitruvius, which we have not room to admit in this place.

**Timber. Age of the Growth of.** The limit to the growth and increase of wood in trees of this sort. It has been remarked by a late writer, that from the old alburnum of such trees being gradually converted into heart-wood, and being continually pressed upon by the expansive force of the new fibres, it becomes harder, denser, and at length loses altogether its vasaclar structure; and in a certain time obeying the common laws of dead matter, decays, decomposes, and is converted into aceriform and carbonic elements; into those principles from which it was originally formed. The decay of the heart-wood would consequently seem to constitute the great limit to the age and size of timber or trees of that kind. This is more liable to take place in some cafes than in others. The age of growth in timber-trees is, however, mostly ascertained by the rings or layers of which they are formed.

In regard to the age of the growth of the oak, the writer of the rural economy of the midland counties has remarked, that there has been lately a fall of timber in the woods there, including some large timber-trees. That he counted the rings of one which was found at the butt: the number, as nearly as he could ascertain it, was two hundred. But those of the last forty or fifty years' growth were thin, he could not count them with certainty; though with sufficient accuracy upon which to ground the calculations given below. The girt of this tree, in the girding place, was nine feet, the diameter of which was something more than thirty-four inches. And the estimated growth, in this part, was thirty inches diameter during the first hundred and fifty years, and four inches (two inches thick) in the half fifty years. The length of the stem was twenty-two feet. The contents of the whole were one hundred and ten feet of timber. Those of the first hundred and fifty years' growth, eighty-five feet; leaving twenty-five feet for the growth of the last fifty years. It is therefore observed, that although the increase of diameter had been comparatively small during the last fifty years, the increase of timber had been nearly as great as in the first stages.

But supposing, it is said, that this tree had been taken down at one hundred and fifty years old, it would, at 22 a foot, have produced 81 10s.; the interest of which would have amounted, in the course of fifty years, to more than 20l.; besides the use of the land during that time: whereas the tree, at that rate, is now worth only 1l. These calculations and inferences are not, however, it is said, intended to excite a spirit of fellling timber prematurely, or at too early an age, a spirit which is already too prevalent; but to endeavour to decide on the most proper age of growth for its being cut down; it being an incontrovertible fact, that, in point of utility, public and private, the fault of suffering timber to stand too great an age, is infinitely greater than that of cutting it down before it has attained its full growth or age. In the latter case, it is said, there is no waste; the interest of money, and the succeeding shoots, or the use of the land, stand against the loss of growth of timber. But, in the former, the principal, interest, aftershoot, and the use of the land, are all thrown away: so that the community, as well as the proprietors, are losers by the management. In the one case, cutting part before it be fit, may save other trees which are more fully grown; but, in the other, the whole is lost. Leaving, it is said, the preservation and management of ship-timber to those to whom it properly belongs, it does not follow that, because it is wrong to suffer timber to stand to waste, it is right to take it down before it be of a proper age, or sufficiently grown, for the purpose of ship-building. It is not overgrown, but over-growing timber which is fit for that use. Timber is seldom cut down prematurely, or at too early an age, but by the necellitous; or by those who have only a temporary posseffion in their respective estates. And what argument, it is asked, can prevail with this class of proprietors? Another class, and it is trusted by much the largest, is composed of those who, considering their timber merely as a profitable part of their several estates, take it down whenever it becomes full-grown, and a fair opportunity offers. And a third class of this sort of proprietors consists of those who, though false pride, false fear, or false economy, suffer their timber to stand until it be over-grown: and if the writer have any other motive for making known the above minutes on the ages of timber-trees, than that of recording facts, it is the desire of placing in its proper light, the improvident management of this class of timber proprietors; and, at the same time, to endeavour to form just ideas of a subject, which has not, hitherto, been brought before the public; but which is pre-eminently entitled to public notice and discussion.

It is additionally stated, that this matter having been rendered, in a considerable degree, familiar to the writer by many years' observation and practice, he may here set down what appears to him the proper ages of growth for cutting down the four following species or sorts of timber.

1. Poplar, from thirty to fifty years old.
2. Elm, from fifty to a hundred.
3. Ash, from fifty to a hundred.
4. Oak, from one to two hundred.

But it is said that it very much depends on situation, and on the soil and subsoil in which timber-trees are rooted. On dry abborant soils, the oak and the elm, at least, are observed to go off much sooner than in cooler more retentive situations. And in a wood, on a dry loam, with a rocky subsoil, the oak was found going fast to decay at two hundred years old; while in another, in a cooler situation, it was found, but unprofitable, at that age: and in a third, perhaps a full cooler spot, it was found, profitable, and wearing every appearance of being in a fit state of growth for being taken down at the age of a hundred and fifty years. These three woods were those of Merevale, Bagot-park, and Staffold, in the midland districts of this country. A full knowledge of the age of growth in timber-trees is a matter of great utility and advantage to the proprietors of wooded lands.

**Timber. Marking of.** The putting of such marks upon timber-trees, or large falls of timber, as may be necessary to distinguish them in felling, and which are of a proper age and growth for being taken down. It is usually performed by means of an instrument of the compaffes kind, by which a circle, with a number, or some other particular fort of mark, is formed on the tree. It is of great use and advantage in felling and disposing of timber, to have this business executed in a careful and judicious manner. See Timber.

**Timber, Measuring of.** See Mensuration and Sliding-Rule.

For finding the area of a board or plank, the rule is simple and easy; which is that of multiplying the length by the mean breadth. If the board is tapering, the breadths at the ends should be added together, and half the sum will be the mean breadth. The method by the sliding-rule is too obvious to need being mentioned.
TIMBER.

Timber-Carriage, that fort of wheel-carriage which is contrived and constructed for the purpose of conveying heavy and other timber. Carriages for this use are formed in a strong firm manner, but in different methods, according to circumstances, and the nature of the timber to be drawn. They are sometimes made with four wheels, but much more frequently only with two. They have occasionally shafts too, but are more often constructed with a pole merely. These carriages, the writer of the rural economy of Norfolk remarks, are in that district, as in most other places, of two kinds; the four-wheeled fort of carriage, provincially “a dray,” and the pair of wheels, provincially “a gill.” The last is made in the ufe. The construction of the griff of this county is, it is said, similar to that of the timber-wheels of most other counties; namely, a pair of tall wheels, with a crooked axle-tree, surmounted by a block; to which axle is fixed a pair of shafts, or sometimes a single pole only. But it is noticed, that the method of using them there, is different from that which has been observed in other places; where the only ufe they are put to is to raise the butt-end of a large timber to be drawn a short distance; the top-end being suffered to drag behind upon the ground, to the great injury of the turf, or the road upon which it is drawn.

In the above county, however, a large flock of timber, or perhaps three or four smaller ones, are, it is observed, entirely flung to the axle; so that, in drawing, no part of them whatever touches the ground; the top-end or part being generally drawn foremost, and the end towards the horses always the heaviest.

It is stated, that the method of taking up a piece of timber is this: the horses being taken of, the wheels are run, by hand, aside the timber to be flung, until the axle is judged to be a few inches behind the balance-point: or, which is better, a chain is flung put round the timber, and the wheels run up to it. It is difficult to ascertain the exact place of fixing the chain by the eye; but nevertheless, a perfon accustomed to fling timber in this manner, will, it is said, come very near the truth. The chain hooked, and the axle brought into its proper situation, the shafts, or pole, are thrown back in the usual manner; the chain carried over the block, brought round the pole, its ends made fast, and the shafts or pole brought down again by the horses; by which means the timber is lifted from the ground, and unfurled to the axle. If the required point of balance be not hit upon at the first trial, the shafts are suffered to rise again, the chain is unhooked, and shifted to its proper situation; the shafts being then again pulled down, are bound by an iron trace, or small chain, close down to the timber; while another small chain or trace is fastened round the foremost end to hook the horses to; the team drawing by the timber, and not by the pole or shafts.

It is supposed, that the utility of having a super-balance of weight forward is two-fold: if the piece were flung in exact equilibrium, it would, upon the road, be in perpetual vibration; thereby rendering the pull unsteady, and extremely inconvenient to the horses: whereas, by throwing the balance forward, the traces are commonly kept down constantly in their proper place, and the pull becomes uniform: if, however, too much weight were to be thrown forward, the draught of the horses would not raise the point of the timber from the ground; the friction would, of course, increase the draught, and the road be at the same time hurt. It therefore follows, it is said, that the proper weight to be thrown forward is such as is enough to prevent a vibration, but not so much as to prevent the point from being raised from the road by the draught of the horses upon level ground. And that the other advantage, by a super-balance forward, is gained in going down a hill; in which case, the draught not being wanted, the point, of course, falls to the ground, and serves as a pall to regulate the motion of the carriage: if the super-balance alone be not sufficient to check the too great rapidity of the motion, the driver adds, it is said, his own weight. Likewise, if, in ascending a hill, the balance be lost; he, in like manner, seats himself upon the fore-part of the load, thereby keeping it down to its proper level.

It is added, that this method of conveying timber may, if possible, be in ufe in other districts; but the writer has not seen it practised any where except in the above country; and that it is known to be an excellent, but not a common mode of practice.

It is of great utility and convenience for timber proprietors and dealers to be always provided with good carriages of this fort.

Timber Hedge-Row, such trees of this kind as are raised and grown in the lines and rows of the hedges. It has been long a disputed point among the writers on agriculture, and which is not yet fully decided, whether it is admissible or not to have trees of this fort in the directions of the hedges: some strongly contending for its utility, on the grounds of the shelter, shade, and timber afforded by the practice; while others as strongly oppose it, on the score of the injury which it does to the crops and the hedges under the trees, as well as the obstruction which it affords in working the land, when in the tillage state. However, in many situations and cafes, there can be no doubt of the advantage of having timber-trees of the hedge-row kind, when under proper and suitable management.

It has been well observed by an able writer on the manners and practices of the country, that although a few trees growing in a hedge, when considered singly, may have little effect, and be of no great value or consequence; yet that a number of hedge-rows, all properly interplied with timber-trees, will completely change the appearance of a hilly country or district, improve its climate, and yield a considerable quantity of timber to the owners of the lands. The consideration of the matter must, of course, it is thought, be of great importance to the landed interest of some parts of the island, especially those in the more northern or mountainous districts of the kingdom. What is necessary to be said on this subject here, may consequently be introduced under the heads of the nature of the lands where timber of the hedge-row kind may be raised and grown without injury to the farmer; and the species or fort of trees which is most proper to be raised in such cases. In regard to the interest of the farmer, the lands which are the most evidently and suitably adapted for the growth of hedge-row timber-trees are all those which are naked and much exposed, and which are kept for the most part under pature; and in so far as the beauty of a country or district, the improvement of its climate, and the health of its inhabitants, are concerned, the hedge-rows of the rilling-grounds alone should be occupied by trees, except a few in the valleys, by the sides of public roads or rivers, to form fore-grounds to the rest of the country or district; and a few near houses or villages to group with them, and afford a richness to their appearance. In low rich valleys between mountains, which are kept in perpetual aration, the hedge-rows should not be taken up by timber-trees of this fort. But a country or district wholly level, as many of the counties and districts in the southern parts of the kingdom are, may sometimes have the hedge-rows partially let with trees, without doing any great injury to the farmer.
TINMER.

Tfarmer; while, if properly managed, it may vary the country, and improve its climate. In such levels, the hedges should, however, be kept very low, and the trees be trained crotch with single items, and few lateral arms or boughs near the surface; or, as is done in some places, the width of an ordinary ridge may be left on each side of the hedge, to be kept in perpetual pasture, which prevents the corn from being too much injured by the trees, and is a great ornament to a farm. This last mode is, however, not without its disadvantages, as it is liable to disseminate and fill the adjoining tillage-lands with the seeds of noxious and hurtful weeds. However, in cafes where the whole farm is to be kept in perpetual pasture, the trees may often be allowed to extend their branches, and the hedges may be kept high or low, at pleasure. Moist or clayey soils should never, when under perpetual aration, be fet with hedge-row trees; and indeed, before they are put into such rows anywhere, or in any cafe, a full consideration and estimate should, it is said, be made of their effect on the annual rent of the land, on their intrinsic value, on the climate, and on the appearance of the country.

The writer of the Yorkshire rural economy considers this an interesting subject to the proprietors of inclosed estates. The old inclosed parts of that neighbourhood, when seen at some distance, have, it is said, the appearance of woodlands; the inclosures being mostly narrow, and full of hedge-row timber. The age, on a par, is about 50 years. In half a century more, the value of the timber of some parts of it, if suffered to stand, will probably be equal to the value of the land; a circumstance, it is supposed, of no small import to the owner. But the detriment to the occupier requires to be considered. In this county, it seems, it is said, to be a general idea, founded perhaps on experience, that lofty hedge-rows are beneficial to grafs-land; increasing its productiveness by their warmth, and giving shelter and shade to pasturing-flock. The roots even of the ash are considered as offensive to land in the state of grafs; in which state the grounds, thus loaded with hedges and timber-trees, are almost universally kept. Indeed it would be impossible, in their present state, to occupy them as arable land. They are entire inclosures, every foot of the areas of which must necessarily be occupied by alien roots; nevertheless they give an ample supply of hay and pasturage; one to two tons of hay an acre; and, in many of them, three acres will afford sufficient pasturage for two cows of the largest size. The rent from thirty to forty shillings an acre. Strong evidence this, it is said, that the roots of the ash are not very hurtful to grafs-land.

It is evident, however, it is thought, that the oak, when suffered to thrall its low spreading head into the inclosure, is injurious to the herbage beneath it; that the leaves of the ash are very detrimental to after-grafts; and that the hedges are annually receiving irreparable damage; no general plan of training up the trees with tall items having, it is believed, in any instance, been adopted, so as to prevent, in any complete manner, such effects.

On these accounts it is concluded, that the advantages accruing from the planting of timber-trees in the hedge-rows of inclosed common fields, of a foil and lying in a situation adapted to grafs, are far superior to any disadvantages arising therefrom, even where they have been suffered to grow in a state of almost total neglect. And that land which has lain open, and which has been kept in a state of aration during a succession of ages, is equally productive of grafs and trees. That it is generally good management to let it lie in grafs for some length of time, after inclosure. Besides, that in the above neighbourhood, it is evident to common observation, that trees flourish with unusual vigour in newly-inclosed lands of arable fields; and that their injury to grafs-land is inconsiderable, when compared with the value of the timber which they produce. The low spreading heads of the oak, and the leaves of the ash, appear to be the chief incompatibilities of these two sorts of trees to grafs-land.

But as an alternation of corn and grafs is, it is thought, generally eligible on lands which our ancestors have made choice of for common fields; and as the roots of the ash are not only obstructions to the plough, but the general nature of the plants is, in a singular degree, inimical to corn; it is consequently necessary to eradicate the ash from the hedge-rows, before the land be again broken up for arable; or to preclude this tedious operation, in the first instance, by planting oak in its stead. It is conceived that the head of the oak may be raised to such a height, as not to be injurious to grafs, nor to the hedge, while yet in a youthful state, even though it were suffered to run up to its natural height.

The roots of the fir tribe of trees afford equal obstructions to the plough; they are, of course, equally objectionable in the hedge-rows of arable fields.

It is suggested, in conclusion, that whenever the inclosures are broken up for corn, the hedges should, in common good management, be headed down, and kept in a dwarfish state; in which state, tall stembled oaks would be a valuable source of timber, without being, in almost any degree, injurious either to the hedges, or to the corn growing under them. But the training of young oaks, and the general management of hedge-row timber, cannot, with any degree of prudence, be left to a mere occupier. When intended as nurseries of timber, they should, it is conceived, be under the immediate direction and management of a person proper for the purpose. See Pollard and Fence.

The writer of the Gloucester report on Agriculture, however, remarks, that the practice of planting timber-trees at all in hedges is liable to objections; for if the tree be left to take its natural growth, which is the best mode of raising it for good timber, the lower fence is ruined by its shade and drippings; or if they are cut up and threated into naked poles, or pollarded for the sake of the top or fire-wood, the timber is injured, and the beauty of the tree destroyed. A better plan is it, it is thought, to affign certain spots on estates for the purpose of raising timber-trees only. This would eventually be no waste of land, because the grafs or corn growing near the hedges, which are filled with timber or fruit-trees, is worth little or nothing. In the small inclosures at the angles of a field, for instance, the trees might take their natural growth; and this would be more rapid, in consequence of their being planted in clumps, and protected. If, however, the old mode of planting in hedge-rows shou'd be continued, the ash may be the best for the purpose. The timber, in some respects, is superior to elm, and, in various cafes, useful where that cannot be applied. In durability it almost rivals the oak, and its growth is improved by being kept to a single item, the only mode of treatment in which trees should be admitted into hedge-rows at all, but which few other trees will bear. The oak and beech particularly, when footed as to become heart-wood, appear to be greatly hurt by the losses of their side branches; the immediate effect of which is a retardation of growth; and it is said, that the oak will not thrive for ten years after this operation; and of the elm, that it is injured, though apparently suffering less. It is, however, to be noticed, that the finest and soundest trees are those which have been most left to their natural growth.
In what relates to the most proper sorts of trees for putting in hedge-rows, in different cases, it may be further noticed, that when the soil is good and deep, according to the first of the above writers, the oak and Scotch elm may be the most suitable; in strong land, the ash; in poor soils, the beech, sycamore, and birch; in cafes of moil soils, as meadows and such like places, the Lombardy poplar, which, besides its timber produce, forms, when in rows, a clofe, erect, narrow hedge, fifty or sixty feet high, in a few years. Such hedges are, however, of no very great value, whether the trees be cut low, or allowed to rise to their full height. The oak and the above sort of elm proper better, it is said, in hedge-rows than in any other situations; their roots have a free range in the adjoining inclosures, while their tops shoot out vigorously on every side, thus often producing excellent ship-timber. More remarks of this nature may be met with in Kent's hints, and Marshall's work on planting. The beech, it is thought, is peculiarly suited for thin soils and exposed situations. When put out about ten or twelve feet asunder, it affords excellent shelter, and, at the same time, a very confiderable quantity of timber. The ash and the sycamore will rise and grow erect on the most exposed upland situations, or near the sea. When put out in good soils, they should generally be trained to one stem; in which state, their timber produce is the most valuable and useful. The reifinous tribe and the evergreen sorts of trees are, for the most part, improper for being set out in hedge-rows. In the different cyder districts or counties in the southern parts of the kingdom, fruit-trees are not unfrequently introduced into the hedge-rows; the practice of which might probably be advantageously had recourse to in many other districts and counties in the same part of the country, as well as in several more to the north. In many different situations they would be a valuable acquisition, without doing any injury, or taking up the more useful part of the land.

In a great number of districts and places where hedge-row timber exists, the situation is often improper, and the management wretchedly bad and negligent; in consequence of which, it has frequently become an injury to the farmer, without yielding any advantage to the proprietor. Two more glaring instances of this cannot, it is thought, be given than in the tall naked elms, and pollarded oaks, which prevail in many places in the southern parts of the illand: the former, by improper lopping and cutting, are worth nothing; and the latter, by being cut over at the height of eight or ten feet, form ugly bully-headed trees, which do great injury and mischief to the farmer, and yield nothing to the owner. In defence of such practices, it has been said, that fuel alone is the intended produce; but certainly it would be much the best method, in such cafes, it is thought, to allot a space or portion by itself for the purpose of raising fuel, and devote the hedge-rows to the more important uses of producing timber. The fuel part of the land might be rented by the farmer, and the hedge-rows belong exclusively to the proprietor. Keeping each sort of woody collection strictly characteristic of its kind is, it is thought, as beneficial in the raising of trees, as the division of labour is in political economy. There is a great number of situations and places in the more northern parts of the illand, as well perhaps as in some others, where hedge-row timber might be cultivated to the advantage of both the landlord and tenant, and the great ornament of the country. Suppose, it is said, an estate of two thousand acres, divided into fields of ten acres each, and the hedge-rows planted with trees at fifteen feet apart; this would be above the rate of eight trees upon the acre, or sixteen thousand trees in the hedges only. At the end of thirty years, if well managed, they would be worth from twenty to forty shillings each; but say only thirty shillings each, this would be sixteen thousand pounds; a very considerable sum, it is said, for a proprietor of only two thousand acres to receive every thirty years, above the annual rent of his estate.

These hints and observations place the utility and importance of hedge-row planting, where it can be done with propriety, in a striking point of view.

**Timber-Inpector**, a term applied to a person who is appointed to inspect and examine the fates of timber-woods, plantations, and forests in any district or place. It has been suggested by the writer of the corrected account of the fates of agriculture in the county of Devon, that, as it is evident that the timber in that county is waiting in a very alarming manner, and the fame is the case in many other timber-wooded districts, it is necessary that an ordinance should be made, that in future no timber-tree should be cut down, or legally exposed for sale, without having the mark of the timber inspector of the district affixed to it, and a certificate accompanying it. This fort of officer should, it is thought, be appointed and paid by government, and to whom annual returns should be made of all matters and circumstances appertaining to his duty, which should also extend to the inspection and examination of all young timber-plantations, &c., where it should be required that he should not only see that a certain number of young trees is planted for every timber-tree that is cut down, but that the same young trees and plantations are well fenced in and protected. That on his observing such timber woodland fences insufficient for their safety, and their owners perfectly unmindful of the report he has made, he should be empowered to order and direct the necessary repairs to be done, and to be enabled to recover the amount of such expense, by levying an immediate distress upon the moveables on the premises of the parties.

It would unquestionably be of great utility and advantage in increasing the quantity, and improving the quality of timber, to have such inspectors in all timber-wooded districts of every description.

**Timber-Plantation**, that fort which is made simply for the purpose of raising and producing timber. Several points and circumstances are necessary to be attended to in the performance of this business, in order to render such plantations the most expeditiously and abundantly productive, such as the proper choice of soil, situation, and exposure, as well as proper fencing in, thinning, training, and pruning, all of which are noticed and explained under their appropriate heads. See Plantation, Planing, Pruning, Thinning, Timber, &c.

**Timber-Repairs**, such as are done by some sort of timber, to be cut down on estates, &c. Rough timber is mostly allowed for repairs to be done by tenants, and it is commonly the custom of this country to permit the topwood of the trees to be taken by them for their trouble and expences in various ways with such timber. In some cases, however, the contrary mode takes place, such topwood being charged to them at a moderate rate or price. And, in all cases, it is thought by the writer of the work on "Landed Property," that the tenant should be charged for the bark of oak-timber, which is now become scarce and of great value, he being allowed for peeling and for carriage to market, or other places.

It is advised that the neat value of the bark and the topwood, where it is charged in these cases of repairs, should be made a fair estimate of when the timber is marked, and charged to tenants in a sum certain. By this means they become,
come, it is thought, interested in the pedling and harvesting or lecouring of the bark: no waile is consequently incurred through their neglect, or any unfair dealings rised; nor is there any disputable account to be settled, on the rent-days between them and the receivers.

In the view too of enabling the acting managers, in such cafes, to *j(e)le*3, in the belt and readiest manner, proper trees for the several different sorts of repairs that may, from time to time, be required, — let, it is said, the woodmen, or those who have the immediate charge of the timber of estates, be directed to note down, in going their rounds, such trees as may be faulty, and are likely to go soon to decay, or which are thinnest in their growth, or too much crowded, and, in general, such as are proper to be taken down for the different uses of estates: whether for erecting or repairing buildings, or for gates or other purposes: in order that they may be able to lead or direct, without loss of time, the acting managers and the carpenters or builders of estates, with the intimates, in their hands, of the quantity and quality of the timber which is requisite to the trees most proper for any given purpose: thus preserving the *crop* of sole timber from unnecessary spoilation, by a lefs discriminate choice or method of proceeding.

*Timber, Stick of,* a term frequently applied to any large boled or flemmed tree of the timber kind: a fine, large, perfect timber-tree. See *Timber and Tree.*

*Timber-Trees,* the wood of timber, before it is felled, particularly that of oak, &c. See *Trees.*

For the raising, planting, transplanting, pruning, &c. of timber-trees, see *Seminary, Nursery, Pruning, and Transplanting.*

*Timber-Wood,* a term signifying that sort of wood which is employed or designed for the raising and growth of timber, in contradistinction to that of the under-wood or coppice kinds, or such as has little or no bruff-wood or under-growth in it. There are but few cafes in which it is not advantageous for timber-woods to be kept pretty clear and free from most sorts of under-growths, especially where they approach near the trees. See *Wood.*

*Timber-Wood or Tree, Register of,* the account which is necessary to be kept of the timber-wood or trees of that kind, which are growing upon the different parts of a timbered estate. The writer of a late work on "Landed Property," has advised that it should consist of all that is met with on the several divisions of an estate; setting forth the number of such trees in each of the different woods, groves, hedge-rows, and all other places, with the several species or kinds, the number which is affixed to each, and the admeasurement of each of them. Separate accounts, containing those trees of each particular division, being entered and kept; for the satisfaction and occasional use of the land-manager and the woodland. Such lists or registers are always of great utility and benefit to the proprietors of timber-wooded estates, as ascertaining their nature, rate, and situation in many different respects.

*Timber-Lads,* in our *Old Writers,* a service by which tenants were to carry timber from the woods to the lord's house.

*Timber, Bearing of,* See *Bearing.*

*Timber-Work, Catalogue of,* See *Casing.*

*Timber of Timber of Furs,* as ermines, martens, fables, and the like, denotes forty lkins; of other lkins, five score. *Ruff.*

"*Hic civitas (i.e. Cæstria) nunc reddébat de firma 45 libras et tres timbris pellium marternum.*" L.L. Edw. Conf.

*Timbers of Ermin, in Heraldry,* denote the ranks or rows of ermin in noblemen's coats.

*Timber, in Falconry.* To timber, is to nettle, or make a net, as birds of prey do.

*Timber, Prick, in Botany.* See *Spindle-Tree.*

*Timbers, in Ship-Building,* the ribs of a ship, or the incurved pieces of wood branching outward from the keel in a vertical direction, so as to give strength, figure, and solidity to the whole fabric.

One timber in a ship is composed of several pieces united into one frame, which accordingly is called by the artificers a frame of timbers. The timbers whose planes are perpendicular to the keel, are called *square-timbers;* and those which are placed obliquely on the keel, as at the extremities of a ship, are called *cont-timbers.* The foremoll of those pieces on the ship's bow are called the *knuckle-timbers;* and the hindermost on the quarter, the *fashion-pieces.* See *Ship-Building.*

*Timber and Room, or Room and Space,* is the distance between the moulding edges of two adjoining timbers, which must always contain the breadth of two timbers; and sometimes two or three inches between them.

*TIMBO,* in Geography, a town of Africa, on the Grain Coast. N. lat. 5° 28'. W. long. 6° 29'.

*TIMBRE,* or *Timmer,* in *Heraldry,* denotes the crest of an armory, or whatever is placed atop of the escutcheon, to distinguish the degree of nobility, either ecleiastic or secular.

Such as the papal tiara, cardinal's hat, the crofs, mitre, coronet, mortier, and particularly the caffes or helmets, which the ancients called more especially timbers, from their resembling a kind of bell without a clapper, which the French call timbre, or because they resounded like those timbers when struck. This is the opinion of Loifeau, who derives the word from the Latin, *tintimabulum.*

*TIMBREL,* *Tabret,* or *Tambour de Bafque,* in *Musica,* is an instrument of very high antiquity; having been in use among the Hebrews, Greeks, and Romans. To the rim were hung bells or pieces of metal.

*TIME* is a portion or part of infinite duration. It is generally measured by motion, and chiefly by the motions of the heavenly bodies.

There is nothing perhaps of which the mind is less capable of forming a distinct idea than time, unconnected with the motions of sensible objects; and yet, on account of this connection, every one thinks it a subject with which he is familiarly acquainted, until an explanation is required.

The opinions of ancient philosophers on the subject are generally vague and contradictory. Pythagoras and Heraclitus maintained that time was a subsistance, but the Stoics considered it as unsubstantiated. Aristotle and the Peripatetics define time to be "a multitude of parts of motion, which pass and succeed each other in a continual flux, and have relations to each other, inasmuch as some are anterior and others posterior." Archytas defined it to be "a continued and indivisibly flux of *nows* or inflants."

The Epicureans considered "time as merely an object of the imagination, or an attribute given to things by the mind while contemplating them either as enduring or ceasing; as pooffing a longer or shorter existence, as enjoying such existence, as having enjoyed it, or as being about to enjoy it."

Lucretius, the great poet and philosopher of this sect, defines time as follows:

"*Tempus item per se non est, sed rebus ab ipsis Consequitur fenus, transactum quid fit in aëro; Tum, quae res insit, quid porro deinde fequatur: Nec per se quemquum tempus tentire futendum est Sememum ab rerum motu, placideque quiete.*"

Lib. i. 460.

Thus
TIME.

Thus translated by Creech:

"Time of itself is nothing, but from thought Receives its rise, by labouring fancy wrought. From things considered, whilst we think on some As present, some as past, or yet to come. No thought can think on time, that's still confess. But thinks on things in motion or at rest."

The above opinion of Lucretius, though supported by many of the ancients, and even by some of the moderns, does not appear to have been falsified philosophers in general. Cicero says (I de Invent.) "difficile est tempus definire." Thus also St. Austin (2 Confess. 24) observes, "si nemo cx me quærat quid fit tempus, feio; fe quærenti explicare velim, nescio."

Locke seems to have considered time more profoundly than perhaps any other philosopher. The following are among his opinions on the subject. Human Underst. vol. i. ch. 14.

"The answer of a great man to one who asked him what time was, 'si non rogas intelligo,' (which amounts to this; the more I set my self to think of it, the less I understand it,) might perhaps persuade one that time, which reveals all things, is not itself to be discovered. Duration, time, and eternity, are, not without reason, thought to have something very abstruse in their nature."

"To understand time and eternity aright, we ought with attention to consider what idea it is we have of duration, and how we came by it. 'Tis evident to one who will but observe what pastes in his own mind, that there is a train of ideas which constantly succeed one another in his understanding as long as he is awake. Reflection on these appearances of several ideas, one after another in our minds, is that which furnishes us with the idea of succession; and the distance between the appearance of any two ideas in our minds, is that which we call duration (which see). Having thus got the idea of duration, the next thing natural for the mind to do, is to get some measure of this common duration, whereby it might judge of its different lengths, and consider the distinct order wherein several things exist; without which, a great part of our knowledge would be confounded, and a great part of history rendered very useless. This consideration of duration, as set out by certain periods, and marked by certain measures or epochs, is that, I think, which most properly we call time."

Nearly according to the above our modern Encyclopedia defines time; viz. "a succession of phenomena in the universe, or a mode of duration marked by certain periods and measures, and principally by the motions or apparent revolutions of the sun." Others define time to be "the duration of a thing, the existence of which is not without beginning or end, which distinguishes time from eternity."

Time is distinguished into absolute and relative. Absolute time is considered in itself, without any relation to bodies or their motions flowing uniformly. Relative time is the sensible measure of any portion of duration by means of motion. As the equal and uniform flux of time does not affect our senses; and as there is nothing in this flux that can make us know immediately time itself; we must, of necessity, have recourse to some motion, by which we can determine the quantity of time, by comparing parts of time with those of space that the moving body traverses. Therefore, as we judge that times are equal, when they flow whilst a body which is in an uniform motion traverses equal spaces; so likewise we judge that times are equal, when they flow whilst the sun, moon, and the other celestial luminaries, complete their ordinary revolutions, which to our senses appear uniform. See Motion.

But as the flowing of time cannot be accelerated nor retarded; as all bodies move sometimes quicker and sometimes slower; and as there is perhaps no perfectly uniform motion in nature, except the earth's rotation on its axis, some authors are of opinion that absolute time cannot be concluded to be something really distinct from motion; for supposing for a moment the earth and the other planets have been without motion ever since the creation, does it thence follow that the course of time would have been stopped or interrupted? Would not the duration of this state of rest have been equal to the time which has elapsed since the creation?

As absolute time is a quantity which flows in a uniform manner, and which is very simple in its nature, mathematicians represent it to the imagination by the most simple sensible magnitudes, particularly by right lines and by circles, with which absolute time appears to have a great analogy in respect of succession, the simplicity of parts, &c.

In fact, it is not absolutely necessary to measure time by motion; for the constant and periodic return of a thing which happens or manifests itself by intervals equally distant from each other, as, for instance, the budding of a plant, &c. may do the same thing. It is laid there are people in America who reckon years by the arrival and departure of birds. Time is usually represented by the uniform motion of a point that describes a right line. The point is the succedent state, present successively at different places, and producing by its succession a continual succession, to which we attach the idea of time. The uniform motion of an object also measures time; for when this motion takes place, the moving body traverses, for example, one foot in the same time in which it has traversed a fift foot; therefore, the duration of things that co-exist with the moving body whilst it traverses one foot being taken as one, the duration of those that will co-exist with its motion whilst it will be traversing two feet will be two, and so on; so that by this means time becomes commensurable, since we can assign the reason of one duration to another duration that we had taken for unity. Thus, in clocks, the hand moves uniformly in a circle: the twelfth part of the circumference of this circle is unity, and time is measured by this unity, by saying two hours, three hours, &c. So likewise one year is taken for one, because the revolutions of the sun in the equinoxes are equal, or nearly so, to our years and we make use of it to measure other durations in relation with this unity. We know the attempts made by astronomers to find a uniform motion, to enable them to measure time exactly; and this is what has been done by means of pendulums. See Pendulum.

There is no measure of time exactly correct. Every one has his own measure of time in the quickness or slowness with which his ideas succeed each other; and from these different degrees of quickness in different persons, or in the same person at different times, arise these modes of speaking; I have found the time very long, or very short; for time appears long to us, when the ideas succeed each other slowly in our mind, and vice versa. The measures of time are arbitrary, and may vary among different people: the only one that is universal is the present instant; and yet some deny the existence of present time, as being constantly on the wing; or, according to Horace, (Carmen XI.)

"Dum loquimur fugerit invida atas."

Time is indeed an inexhaustible subject for figurative and poetical allusions, and even for paradoxes. Thus, it is said to
TIME.

to owe its own immaterial being to the creation of material order: to have all its portions measured by the periodical motions of matter, and yet to be distinct from, and independent of, these motions for its existence, though it could not exist until they existed: also that it operates upon every thing, yet touches nothing. Many other contradictory properties might be mentioned, but such tend to darken rather than to elucidate the subject. Some philosophers have gone even so far as to deny the existence of time; for if there be no present, there cannot be any future, and the past certainly has no existence.

We now come to consider the application of mathematics to time, as connected with astronomical computations, where the subject is accurately calculated, and rendered subservient to the important purposes of measuring space, by which the longitude is determined both in the heavens and on earth.

Astronomical time is distinguished into solar or apparent time, mean time, and sidereal time.

Apparent time, also called true solar and astronomical time, is regulated by the apparent motions of the sun. Mean or mean solar time, also called equated time, is a mean or average of apparent time: and sidereal time is shown by the diurnal revolutions of the fixed stars.

An apparent day is the interval between two successive transits of the sun's centre over the same meridian, which interval is subject to continual variations, owing to the eccentricity of the earth's orbit, and the obliquity of the ecliptic to the equator. Thence variations are computed in a table, for which see EQUATION Of Time.

A mean day is the interval that would be observed between two successive transits of the sun's centre over the same meridian, if the earth's orbit were circular, and the sun always in the equinoctial. Thus the intervals or transits would be all equal, such as are shown by a clock that goes exactly 24 hours in a day, and 365 $\frac{1}{4}$ $^b$ 48$m$ 48$^s$ in a year. A clock thus set is said to be adjusted to mean time.

A sidereal day is the interval between two successive transits of a star over the same meridian; which interval is uniform, because all the fixed stars make their revolutions in equal times, owing to the uniformity of the earth's diurnal rotation on its axis.

The sidereal day is shorter than the mean solar day by $3m$ 56$^{1/2}$ sidereal time. This difference arises from the sun's apparent annual motion from west to east, which leaves the star as it were behind. Thus, if the sun and a star be observed on any day to pass the meridian at the same instant, the next day, when the star returns to the meridian, the sun will have advanced about a degree earlier (his daily portion of the ecliptic): and, as the earth's diurnal rotation on its axis is from west to east, the star will come to the meridian before the sun, inasmuch that at the end of the year it will have gained a day on the sun, that is, it will have passed the meridian 366 times, while the sun will have passed it but 365 times. Now as the sun appears to perform his revolution of 360° in a year, say, as 360 $^b$ 48$m$ 48$^s$; 360$^b$ = 90$^b$ 59$^m$ 8$^s$, which is the space the sun would describe in a day, if all the days were of an equal length; and this space reduced to time, = 3$^b$ 56$^{1/2}$ 55 = the excess of a mean day above a sidereal day, in sidereal time, or 3$^b$ 55$^{1/2}$ in mean solar time.

It therefore appears that the earth describes about its axis an arc of 360° 59$^m$ 8$^s$ in a mean solar day, and an arc of 360° in a sidereal day; therefore, as 360 $^b$ 59$^m$ 8$^s$ : 360$^b$ :: $24^b$ : $23^b$ 56$^b$ 4$^b$.09 = the length of a sidereal day in mean solar time, or the interval between two successive transits of a star over the same meridian.

Hence the following general rule for converting sidereal to mean time, and the contrary:

As $24^b$ : $23^b$ 56$^b$ 4$^b$.09 :: any portion of sidereal time to its equivalent in mean time. And as $23^b$ 56$^b$ 4$^b$.09 : $24^b$ :: any portion of mean time to its equivalent in sidereal time.

Thus Tables I. and II. in our article Chronometer are computed.

From what has been said, it is evident that apparent and mean time are the same, with respect to the length of the hour, minute, and second of each, as well as of the year; but the hour, minute, and second of sidereal time are respectively less in the above proportion. It is only the solar and mean days that differ, and this variation is marked by the times of commencement. Thus the apparent day always begins when the sun's centre is on the meridian; but the mean day commences sometimes sooner and sometimes later, as computed in the tables of the equation of time. See EQUATION Of Time.

The reduction of time, that is, to turn apparent, mean, and sidereal time into each other, may be performed by the following theorems, taken from Kelly's Spheres, p. 208, ed. 4.

Let A = apparent time.
M = mean time.
S = sidereal time.
E = the equation of time at apparent noon.
$\epsilon$ = the daily difference of the equation of time.
R = the sun's right ascension at apparent noon.
r = the daily increase of the sun's right ascension.
N = the sun's mean right ascension at mean noon.
i.e. = the sidereal time at mean noon.
m = the reduction of sidereal time at the rate of $3^{1/2}$ 55$^{1/2}$ for 24 hours sidereal time.
s = the reduction of mean to sidereal time, at the rate of $3^{1/2}$ 56$^{1/2}$ for 24 hours mean time.

And let ± signify that addition or subtraction which is to be used according as the quantity under consideration is increasing or decreasing.

Also let $\Lambda' = M + E$, as applied in case 2.

Formulae for the Reduction of Time.

<table>
<thead>
<tr>
<th>Case</th>
<th>Given</th>
<th>Req't.</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A</td>
<td>M</td>
<td>$M = A \pm E \pm \frac{A \times \epsilon}{24}$</td>
</tr>
<tr>
<td>2</td>
<td>M</td>
<td>A</td>
<td>$A = A' \pm \frac{A' \times \epsilon}{24} \pm \epsilon$</td>
</tr>
<tr>
<td>3</td>
<td>M</td>
<td>S</td>
<td>$S = N + \frac{M - \epsilon}{24}$</td>
</tr>
<tr>
<td>4</td>
<td>S</td>
<td>M</td>
<td>$M = S - N - m$</td>
</tr>
<tr>
<td>5</td>
<td>A</td>
<td>S</td>
<td>$S = A + \frac{A \times r}{24} + R$</td>
</tr>
<tr>
<td>6</td>
<td>S</td>
<td>A</td>
<td>$A = S - R \frac{S - R \times r}{24 + r}$</td>
</tr>
</tbody>
</table>

The
The foregoing six cases comprehend all the varieties that occur in the reduction of time; and for their numerical illustration, see our article CHRONOMETER.

For the application of time to the measurement of space and motion, see Longitude and Lunar Observations.

Time, Civil, is almanac time accommodated to civil uses, and formed and distinguished into years, months, days, and hours, with their subdivisions: the reckoning of the hours as civil to twelve twice over, is meant to mark the natural day.

Time, in Heathen Mythology, was perfomnified and deified. Saturn was usually the symbol of it. Time was represented with wings, to mark the rapidity with which it passes, and with a scythe, to signify its ravages. It was divided into several parts; the century, the generation or space of thirty years, the lunarium, the year, the seasons, the months, the days, and the hours; and each of these parts had its particular figure in men or women, according as their names were matrilineal or patrilineal; their images were used in religious ceremonies.

Time, in Music, is an affection of sound, by which we denominate it long or short, with regard to its continuance in the same degree of tune.

Time and tune are the great properties of sound, on whose difference or proportions music depends: each has its several charms: where the time or duration of the notes is equal, the differences of tune alone are capable of entertaining us with endless pleasure.

And of the power of time alone, i.e. of the pleasures arising from the various measures of long and short, swift and slow, we have an instance in the drum, which has no difference of notes, as to tune.

Time, in music, is considered either with respect to the absolute duration of the notes, i.e. the duration considered in every note by itself, and measured by some external notion foreign to the music; in respect to which the composition is said to be quick or slow: or it is considered with respect to the relative quantity or proportion of the notes compared with one another. See Note.

The signs or characters by which the time of notes is represented, are shewn under the article CHARACTERS, in Music, where the names, proportions, &c. are also explained.

A semi-breve, for instance, is marked to be equal to two minimis, a minim to two crotchetts, a crotchet to two quaveris, and so on, still in a duplicate ratio, i.e. in the ratio of 2:1. Now where the notes respect each other thus, i.e. where they are in this ratio, the music is said to be in duplo, i.e. double or common time.

When the several notes are triple of each other, or in the ratio 3:1, that is, when the semi-breve is equal to three minimis, the minim to three crotchetts, &c. the music is said to be in triple time.

To render this part as simple as possible, the proportions already stated among the notes are fixed and invariable: and to express the proportion of 3:1, a point (.) is added to the right side of any note, which is deemed equivalent to half of it; and by this means a pointed semi-breve, O, becomes equal to three minimis, and so of the rest.

From hence arise several other ratios constituting new kinds of triple time; as 2:3 and 3:4, &c. but these, Mr. Malcolm observes, are of no real service, and are not perceived without a painful attention. For the proportions of the times of notes, to afford us pleasure, must be such as are not difficultly perceived; on which account the only ratios fit for music, beside that of equality, are the double and triple.

Vol. XXXV.

Time, Common or Duplo, is of two species: the first, when every bar or measure is equal to a semi-breve, or its value in any combination of notes of a less quantity. The second, where every bar is equal to a minim, or its value in less notes. The movements of this kind of measure are various, but there are three common distinctions; the first slow, signified at the beginning by the mark C; the second quick, signified by \( \frac{1}{4} \); the third very quick, signified by \( \frac{1}{4} \).

But what that slow, quick, and quick is, is very uncertain, and only to be learned by practice. The nearest measure we know of, is to make a quaver the length of the pulse of a good watch; then a crotchett will be equal to two pulses, a minim to four, and the whole measure or semi-breve to eight. This may be reputed the measure of quick time; as for the slow, it is as long again, and the quick is only half as long.

Some propose to measure it by imagining the bar as actually divided into four crotchets, in the first kind, and to make the whole as long as one may distinctly pronounce these four words, one, two, three, four, all of equal length; so that the first crotchett may be applied to one, the second to two, &c. and for other notes proportionally; and this is made the brisk movement of common time.

The whole measure then of common time is equal to a semi-breve, or a minim; but these are variously subdivided into notes of less quantities.

Now to keep the time equal, we must use of a motion of the hand or foot, thus: knowing the true time of a crotchett, we shall suppose the measure or bar actually subdivided into four crotchets for the first species of common time; then half the measure will be two crotchets; therefore the hand or foot being up, if we put it down with the very beginning of the first note or crotchett, and then raise it with the third, and then down to begin the next measure; this is called beating of time.

By practice, they get a habit of making this motion very equal, and consequently of dividing the measure or bar into equal parts, up and down; as also of taking all the notes in the just proportion, so as to begin and end them precisely with the beating. In the measure of two crotchets, they beat down the first, and the second up. Some call each half of the measure in common time, a time; and so they call this the mode or measure of two times, or the duplo measure.

Again, some mark the measure of two crotchets with a 2 or 4, signifying it to be equal to two notes, of which four make a semi-breve; and some mark it 4 for quavers. Malcolm's Music, p. 385, &c.

Time, for Triple. See TRIPLE-TIME.

Time-Table. See CHARACTERS, FRANCO, and PLATE 1.*

Time, in Fencing. There are three kinds of time; that of the sword, that of the foot, and that of the whole body. All the times that are perceived out of their measure, are only to be considered as peals, or feats, to deceive and amuse the enemy. See FENCING.

Time, in the Manege, is sometimes taken for the motion of a horfe, that observes measure and junctures in performing a manege; and sometimes it signifies the interval between two of his motions. In the manege of a step and a leap, the horse makes by turns a corvet between two capricoes; and in that case the corvet is one time that prepares the horse for the capricoes.

4 S
TIM

The times observed in making a flop are nothing but so many falcades.

Tima also signifies the effect of one of the aids; thus, we say, a good horseman disposes his horse for the effects of the heel, by beginning with one time of the legs, and never runs precipitately upon his times.

Time of flowering Flowers, in Gardening, among florists, the period or season of exhibiting those of the finer kinds, either on the summer stages for this purpose, or in other places. For some sorts of flowers, as those of the auricula and other similar kinds, it is usually from about the latter part of April until about the beginning of May, in situations near the metropolis, in which length of period or season there are commonly about four such shows at different suitable intervals of time.

In other sorts of fine flowers, the shows are mostly somewhat later, and do not last any great length of time, as for tulips, carnations, and some other similar kinds; and there are still a few others which last differently in regard to time, or a great part of the summer season. See Summer-Stages.

Time-Keeper, in a general sense, denote instruments adapted for measuring time. See Chronometer.

Time of Peace. See Peace.

Time, in Chronology. See Chronology.

Time, in Grammar. See Tense, Prosody, and Measure.

Time, in Mechanics. See Motion.

Time, Periodical. See Period.

Time, Equation of. See Equation.

Time, Kipper. See Kipper.

Time, Unity of. See Unity.

TIMELIFORME, in Geography, a bay of the North Sea, on the coast of Norway; 32 miles W. of Romfidal.

TIMEN-GUY, in Rigging, a rope fastened at one end to the fore-shrouds, and nailed at the other end to the anchor-stock, on the bow, to prevent the fore-sheet from entangling.

TIMENS, in Geography, a town of Norway, in the province of Christianfand; 15 miles S. of Stavanger.

TIMERA, a town in Sweden, in the province of Melpadla; 5 miles S. of Sundsvall.

TIMERY, a town of Hindoostan, in the Carnatic; 6 miles S. of Arcot.

TIMERYCOTTA, a town and fortress of Hindoostan, in Golconda; 53 miles S.E. of Hyderabad. N. lat. 15° 20'. E. long. 79° 26'.

TIMERYDURGAM, a town of Hindoostan, in Baramaul; 21 miles N.N.W. of Darcmpoury.

TIMESQUIT, or TIMESQUIT, a town of Africa, in the country of Darah; 80 miles W. of Tafilet.

TIMETHUS, in Antique Geography, a river of Sicily, the mount of which is placed by Ptolemy between Tyndarium and Agathyrum.

TIMICI, Abat-el-Wed, a place in Africa, S.E. of Arimara, on the banks of one of the rivers which formed the Caritum; and in which are ruins.

TIMIRU, in Geography, a town of the island of Cuba; 20 miles W.S.W. of Villa del Príncipe.

TIMMER. See TIMBER and TIMIRE.

TIMMIA, in Botany, received that name from the celebrated Hedwig, in compliment to his correspondent Mr. Joachim Christian Timm, an apothecary and principal magistrate at Malchin, who published Flora Megapolitana Præ-dromus, in 1788. This makes an octavo volume, containing the names, characters, places of growth, &c. of the native plants of Mecklenburg-Schwerin, disposed according to the Linnaean system, with the abolition of the 20th, 21st, 22d, and 23d classes, and a separation of all the grasses and grafs-like plants together, into a clafs by themselves. The number of species is 1200, of which 50 belong to the Cryptogamia, the other classes being far from rich. Neither does the work contain any critical observations to compensate for the inconvenience of the above changes.—Hedw. Crypt. v. 1. 83. Sp. Mufc. 176. Schreb. Gen. 761. Timm. Megapol. 234.—Clafs and order, Cryptogamia Mufci. Nat. Ord. Mufci.

Eff. Ch. Capule ovate. Outer fringe of fifteen pointed teeth; inner membraneous, with jointed teeth combined at the top. Male flowers on the same plant, axillary, flaked, bud-shaped.

The known species are two only. T. megapolitana, Hedw. Crypt. v. 1. 83, t. 31, found near Malchin, growing in boggy ground among Carices, as well as in North America; and T. andrica, Hedw. Sp. Mufc. 176. t. 42. f. 1—7, native of Scheneberg, a celebrated Austrian mountain. Both have the habit of Bryum, or Mnium; see those articles. We cannot consider Timmia as an admirable genus, being distinguished from Bryum merely by the connexion of the points of the inner fringe, like Pohlia of Hedwig, which the reader will find in its proper place. Under the head of Fringe of Mufci we have suggested the objections to founding genera on the differences of figure in the inner fringe, which are uncertain, variable, very difficult to observe, and lead to unnatural distinctions. Characters derived from the situation of the male flowers are subject to still greater difficulties and objections.

TIMISKAMAIN LAKE, in Geography, a lake of North America, in Canada. This lake gives name to a tribe of Indians near it. N. lat. 47° 30'. W. long. 86° 46'.

TIMMS, a town of North Carolina; 15 miles S.S.E. of Fayetteville.

TIMOAN, an island in the East Indian Sea, inhabited by Malays; ships may obtain wood and water; the anchorage is good almost all round the island; but the inhabitants are fairly and inoffensive. N. lat. 2° 58'. E. long. 104° 25'.

TIMOCHARIS, in Biography, an astronomer of Alexandria, who flourished in the third century B.C. He observed B.C. 294, on the 5th of March, four hours before midnight, a conjunction of the moon with the Spica Virginis, the star being then, according to him, 8° W. from the equinoctial point.

TIMOK, in Geography, a river of Servia, which rises in mount Hamus, and runs into the Danube, 6 miles N. of Viddin.

TIMOLEON, in Biography, a distinguished example of patriotism and attachment to liberty, was of noble parentage, and a native of Corinth. His discriminating character was exhibited at an early age in the refuge of his brother Timophanes at a moment of danger, when he was thrown from his horse in an engagement with the Argives, and surrounded by the enemy. Timoleon flew to his aid, covered him with his shield, and after receiving many wounds, liberated his brother. This same brother, being placed by the Corinthians for the safety of their city at the head of a standing body of mercenaries, assumed the sovereignty of the state; but Timoleon, dreading the subversion of the liberty of his country by the ambition of his own brother, renounced against his proceedings; and, finding his own attempts for restraining him ineffectual, engaged two friends to concur with him in his efforts; but their united endeavours proving of no avail, Timoleon is said to have flown by him weeping, with his face covered, while his associates dispatched the tyrant. Such is the account of Plutarch; but Diodorus says, that Timoleon killed his brother with his own hand. This act,
act, however, followed by the reproaches of his friends, and by the imprecations of his mother, was the occasion of poignant diftre to Timoleon; so that he withdrew from all public affairs, and for some years wandered about in the most disconsolate state, in the most gloomy recesses of his grounds, without ever approaching the city. After a retirement of twenty years, the Syracusans applied to Corinth for succour in a season of calamity, occasioned by domesimal tyrants, and by the hostile preparations of the Carthaginians. The Corinthians passed a vote for granting the affiance that was required, and Timoleon, in preference to many others who were proposed, was appointed their general. Timoleon failed for Sicily in the year B.C. 344, with a fleet of about ten sail, and arriving, by a stratagem, in the port of Tauro-
menium, disembarked his army, consisting of no more than one thousand men. Success and victory attended his arms; and having become master of Syracuse, he destroyed its citadel as a nest of tyrants, and caused to be erected in its place a hall of judicature; thus intimating, that the state was now to be governed by laws, and not by arms. He also colonized the city, which had been depopulated, by an importation of Greeks, and by inviting all the fugitives to return. Timoleon at the same time extended his attention to the other cities of Sicily, reducing those inhabitants who had usurped authority to the rank of private citizens, or fending them as exiles to Corinth. He prepared likewise to refit the Car-
thaginians, who were sending a powerful army against the island; and with a small force, but by extraordinary displays of valour and military skill, totally defeated them. He afterwards directed his attention to the internal state of Si-
cily, and by the meafures which he adopted, settled its in-
habitants in the unmoled poffeffion of the advantages which they enjoyed in a fertile soil and propitious climate. The Sicilians acknowledged their obligations with gratitude and refeft, and confidered Timoleon as the common father of the nation. Having fixed his abode in Syracuse, he went to Corinth for his wife and family, and lived as a private ci-
tizen, refpected and esteemed for his virtues. Two dema-
gogues, however, contrived to disturb his tranquillity, and 
brought charges againft him, which he thought unworthy of refutation, and in reference to which he merely said, “he could not sufficiently express his gratitude to the gods for allowing him to fee the time when the Syracusans enjoyed 
the liberty of speaking what they thought proper.” Whilft 
Greece was involved in the calamities of a civil war, and in 
conflicts which terminated in the loss of public liberty, Ti-
moleon was unmolested and tranquil, in a country which he had contributed to render happy. Fortunately in all his tran-
actions after he left Corinth, he averted his succesfes to the goddes Fortune, and dedicated to her the house in which he resided. It has been observed, that in the fystem of the ancient, a regard to these nominal and fictitious deities did not exclude their belief of a superintending providence; and a particular infiance occurs in the history of Timoleon which would lead him to imagine that his life and its inci-
dents were under a providential care and direction. Soon 
after his arrival in Sicily, two strangers were hired to affafi-
nate him; and whilst he was facrificing in the temple of Adra
cum, where he then lived, these murderers mixed in the thron, and were preparing to execute their commiffion. At this instant a man gave one of them a blow on the head with his sword, which laid him at his feet, and then flid to the top of a rock. The other, supposing their defign had been discovered, laid hold of the altar, and intreated Timo-
leon to spare his life, on condition of his revealing the whole
plot. The first fugitive being brought down from the rock, affected that he had committed no crime, becaufe the
man whom he had strick had murdered his father in the city 
of Leontium. Such an escape would naturally impress a 
mind less thoughtful than that of Timoleon.

At a late period Timoleon lost his fight, and this affliction he bore with perfect resignation; and it was alleviated to 
him by the affiduous attentions of the Syracusans. In his 
old age he was revered by the Syracusans as a father in the 
midft of his family: and at length terminated his life by a 
flight diseafe, in the year B.C. 335. His funeral obsequies 
were attended by a great number of people; and when the 
body was placed on the pile, a herald made the following 
proclamation: “The people of Syracuse inter Timoleon the 
Corinthian, the son of Timodamus, at the expence of two 
hundred minae; they honour him, moreover, through all 
time, with annual games, to be celebrated with music, horseracing, and wrestling; as the man who destroyed tyrants, 
subdued barbarians, repeopled great cities which lay defo-
late, and restored to the Sicilians their laws and privileges.” A monument was afterwards erected to his memory in the mar-
ket-place, which being surrounded with porticoes and other public buildings, was made a place of exercise for the 
youth, and named the “Timeonicum.” Plut. Vit. Timol. 

TIMON the Philofian, a disciple of Pyrrho, flourifhed in the time of Ptolemy Philadephus, and lived to the age of 
nineti ninety years. At an early age he visited Megara, for 
the advantage of Stilpo’s instructions in dialectics, and after-
wards removed to Elea, where he became a hearer of Pyrrho. 
He first profefled philosophy at Chalcodon, and afterwards 
at Athens, where he remained till his death. He took no 
little pains to invite disciples to his school, that it has been 
fait of him, that as the Scythians shot flying, Timon gained 
pupils by running from them. This indifference to his pro-
feffion was probably owing to his love of eafe and indulgence; 
for he was fond of rural retirfment, and so much addicted 
to wine, that he held a successful content with several 
celebrated champions in drinking. This disposition pro-
bably led him to embrace the indolent doctrine of fepticifm. 
He feems to have treated the opinions and difputes of the 
philofophers with contempt, for he wrote with farceiftic in-
numer against the whole body. His poem, entitled “Sili,” 
often quoted by the ancients, was a keen satire, abounding 
with bitter invectives againft men and doctrines. The 
remaining fragments of this poem have been indifcreetly 
collected by Henry Stephens, in his “Poetis Philofophici.” 
The public succession of profeflers in the Pyrrhic school 
terminated with Timon. Brucker by Enfield.

TIMON, Samuell, a writer of history, was born at Tiri
nau, in Hungary, and died at Caftoria, in 1736, at the age of 
sixty-one years. In 1693 he entered among the Jesuifs, 
and being of feeble constitution, declined the labours of the 
society, and devoted himfelf to literarv occupation, parti-
cularly to the history of his own country, in reference to which he published several works. Nouv. Dict. Hist.

TIMONELLE, Timoner, Fr., in Sea Language, the 
helmman, or perfon who manages the helm to direct the 
ship’s course.

TIMONITIS, in Ancient Geography, a country of Afia, 
in Paphlagonia, in the vicinijty of Bithynia. Strabo and 
Ptolemy.

TIMONVILLE, in Geography, a town of France, in 
the department of the Mofelle; 9 miles W. of Morhang.

TIMOOGOODA, a town of Hindooftan, in the cir-
cuit of Ciacaco; 90 miles S.W. of Cicaco.

TIMOFFEEVA, a town of Russia, in the government of 
Irkutsk, on the Ilm; 32 miles N.W. of Vorcholenk.

TIMOR, an island in the East India sea, about 120 
miles
TIM

The Portuguese were the first Europeans who formed any kind of settlement on this island, who fled to it as a place of refuge from their enemies, the Dutch. But they were purged by those implacable enemies, and in the year 1613 driven from Copen, or Coupang, a town situated at the west end of the island, where the Dutch have ever since poissified and garri\oned a fort which the Portuguese had erected. The chief of the natives, or king of the island, is by the Dutch called k\yfer (emperor). Some Portuguese reside in the north part of the island. The principal productions are faders or fandal wood and wax, which the Dutch receive in exchange for coarse linens or piece-goods; but on the whole, the profit arising from the commerce is little more than sufficient to defray the expenses, and the settlement in all probability is continued merely to keep out other nations. S. lat. 7° 16' to 10° 24'. E. long. 124° to 126° 21'.

TIMOROSO, in the Italian Mufier, intimates that the song is to be played or sung in such a manner as to express an awe or dread, either to shew respect, or to reprefent fear.

TIMOROUS, in the Mange. See STARTING, SKIT\ISH, &c.

TIMOTEO DA URBINO, in Biography, whose real name was T. della Vite, was born at Urbino in 1470. He received his education as an artist under F. Francia, at Bologna, but at the age of twenty-fix returned to his native city, whence he soon after went to Rome to fee his countryman, Raphael, and the great works in the Vatican which had recently acquired for him so much renown. Raphael employed him in painting the Sibyls in the church of La Pace, and was delighted with his ability in the performance; so much so, that he allowed him to retain the Cartoon. After this he returned to Urbino, and there executed several great works for the cathedral and other public buildings. He improved his style, as it was natural he should, under the tuition of his great master: and his latter productions exhibit much grace and vigour in their execution. His most celebrated works are, the Conception, in the church of the Osservanti, at Urbino; and Christ appearing to Mary Magdalen, in S. Angelo, at Cagli. He died in 1524, aged fifty-four.

TIMOTHEUS, one of the most celebrated poet-muficians of antiquity, was born at Miletus, an Ionian city of Caria, 246 B.C. He was contemporary with Philip of Macedon, and not only excelled in lyric and dithyrambic poetry, but in his performance upon the cithara. According to Paufanias, he perfected that instrument by the addition of four new flings to the seven which it had before; though Suidas says it had nine before, and that Timotheus only added two, the tenth and eleventh, to that number.

It seems necessary here to state the several claims made in favour of different persons who have been said to have extended the limits of the Greek musical scale.

Many ancient and respectable writers tell us, that before the time of Terpander, the Cretan lyre had only four flings; and, if we may believe Suidas, it remained in this state 856 years, from the time of Amphion, till Terpander added to it three new flings, which extended the musical scale to a heptachord, or seventh, and supplied the player with two conjunct tetrachords.

It was about 150 years after this period, that Pythagoras is said to have added an eighth fing to the lyre, in order to complete the octave, which consisted of two disjunct tetrachords.

These dates of the several additions to the scale, at such diftant periods, though perhaps not exact, may, however, if near the truth, shew the slow progress of human knowledge, and the continued ignorance of barbarous times. But if we wonder at the music of Greece remaining so many ages in this circumscribed state, it may be asked, why that of China and Peria is not better now, though the inhabitants of those countries have long been civilized, and accustomed to luxuries and refinements.

Bothus gives a different history of the scale, and tells us that the syturn did not long remain in such narrow limits as a tetrachord. Chorebas, the son of Athis, or Atys, king of Lydia, added a fifth fing, Hyagnis a sixth, Terpander a seventh, and, at length, Lycabon of Samos, an eighth. But all these accounts are irreconcilable with Homer's Hymn to Mercury, where the chelys, or tetrachord, the invention of which he ascribes to that god, is said to have had seven flings. There are many claimants among the musicians of ancient Greece, to the flings that were afterwards added to these, by which the scale, in the time of Aritoxenus, was extended to two octaves. Athenæus, more than one, speaks of the nine-flinged instrument; and Ion of Chios, a tragic and lyric poet and philosopher, who first recited his pieces in the 82d Olympiad, 452 B.C. mentions, in some verses quoted by Euclid, the ten-flinged lyre; a proof that the third conjunct tetrachord was added to the scale in his time, which was about fifty years after Pythagoras is supposed to have constructed the octachord.

The different claimants among the Greeks to the fame musical discoveries, only prove that music was cultivated in different countries; and that the inhabitants of each country invented and improved their own instruments, some of which happening to resemble those of other parts of Greece, rendered it difficult for historians to avoid attributing the same invention to different persons. Thus the single flute was given to Minerva, and to Maryyas; the lyxyn, or sifula, to Pan, and to Cybele; and the lyre, or cithara, to Mercury, Apollo, Amphion, Lutus, and Orpheus. Indeed, the mere addition of a fing or two to an instrument without a neck, was so obvious and easy, that it is scarcely possible not to conceive many people to have done it at the same time.

With respect to the number of flings on the lyre of Timotheus, the account of Paufanias and Suidas is confirmed in the famous decree against him, for which see SENATUS-CONSULTUM.

It appears from Suidas, that the poetical and musical compositions of Timotheus were very numerous, and of various kinds. He attributes to him nineteen noms, or canticles, in hexameters; thirty-fix prosms, or preludes; eighteen dithyrambs; twenty-one hymns; the poem in praise of Diana; one panegyric; three tragedies, the Persians, Phinidas, and Laertes; to which must be added a fourth, mentioned by several ancient authors, called "Niobe," without forgetting the poem on "The Birth of Bacchus," Stephen of Byzantium makes him author of eighteen books of nomes, or airs, for the cithara, to eight thousand verses, and of a thousand Plegyias, or preludes, for the names of the flute.

A musician so long eminent as Timotheus, must have excited great desire in young students to become his pupils; but, according to Bartholomus, he used to exact a double price from all such as had previously received instructions from any other master; saying, that he would rather instruct those who knew nothing, for half price, than have the trouble of untaching...
The produce per acre is

Weight when dry of produce of fame space

Weight lost by produce of fame space in drying

Weight of nutritive matter afforded by fame

Weight of nutritive matter, lost by leaving the crop ripe, exceeding one half of its value

At the time the feed is ripe:

 Produce per acre

Weight when dry of produce of fame space

Weight lost by produce of fame space in drying

Nutritive matter afforded by produce of fame space

Latter-math, produce per acre

Affords of nutritive matter

Sixty-four drachms of the straws, afford seven drachms of nutritive matter. The nutritive powers of the straws simply, therefore, it is said, exceed those of the leaves, in proportion of 28 to 8; and the grasfs at the time of flowering, to that at the time the feed is ripe, as 10 to 23; and the latter-math to the grasfs of the flowering crop, as 8 to 10.

From the whole of these particulars, the comparative merits
ments of this grass will, it is supposed, appear to be very great; to which may be added the abundance of fine foliage which it affords early in the spring; in which respect it is inferior, it is said, to the fertile meadow-grasses and narrow-leaved meadow-grass. The value of the straws at the time the feed is ripe, exceeds that of the grass at the time of flowering, as 28 to 10; a circumstance which increases its value, it is thought, above many others: for, by this property, its valuable early foliage may be cropped, to an advanced period of the season, without injury to the crop of hay, which, in other grasses that send forth their flowering straws early as the seafon, would cause a loss of nearly one-half of the value of the crop, as is clearly shown in many instances; and this property of the straw itself, makes the plant peculiarly valuable for the purpose of hay.

In the smaller variety of this grass, the produce per acre on the farm of good land, at the time of ripening the feed; the weight when dry; the loss of weight in drying; and the nutritive matter afforded, are all very considerably less than in the above fort. In the latter-kind produced on the same farm, the quantity is the same as in that, but the nutritive matter afforded by it something less, as may be seen in the work referred to above.

In the bulbous-stalked species, the produce of the acre in the same kind of land, at the time of flowering; the weight when dry; that lost by the produce of the same space in drying; and the quantity of nutritive matter afforded by it, are all rated in the same work to be greatly less than in the first kind. And that this grass is inferior in many respects to that of the first kind. That it is sparingly found in meadows. And that from the number of bulbs which grow out of the straws, a greater proportion of nutritive matter might have been expected. This seems to prove, it is said, that these bulbs, in this fort of grass, do not form so valuable a part of the plant as the joint, which are so conspicuous in the first kind, the nutritive powers of which exceed those of this bulbous-stalked kind, as 8 to 28.

The qualities and useful properties of timothy grass are thus well pointed out and determined. See Pileum and Grass.

TIMOU, or Tumen, in Geography, a town of Thibet; 225 miles E.S.E. of Laffa.

TIMOUR, or TAMERLANE, in Biography, a famous Oriental conqueror, was born at the village of Sebazar, in the territory of Caffi, 40 miles S. of Samarcand, in the year 1356. At the time of his birth, the Khans of Caffgar, with an army of Getz or Kalmucks, invaded Transoxiana. In 1557, Timour, having lately lost his father, collected a number of followers with a view of delivering his country; but being defeated by them, he retreated to the desert, and his army was there further diminished by an action with the Getz. He then wandered with his wife and seven companions, and being arrested, was kept two months in prison. Upon his liberation he swam over the rapid stream of Oxus or Jihon, and for some months led the life of a vagrant. In process of time, and on return to his native country, he was at the head of a considerable force, which enabled him to expel the Getz from Transoxiana. After a civil war between him and his brother-in-law, the Emir Houftein, who was defeated and put to death, Timour, at a general diet held in 1370, was seated on the throne of Zagatai, at the city of Balk, and invested with the high title of Sahb Karan, or emperor of the Age; upon which he repaired to Samarcand, which became the seat of his empire. In consequence of this elevation, his ambition was directed to greater objects; and having reunited to Zagatai its former dependencies, Karizme and Kandahar, he fixed his views on the kingdoms of Iran or Peria, which were then occupied by various usurpers. Having reduced to subjection Ibrahim, the prince of Shirwan, and secured the conquest of Erars or Peria proper, by the defeat and death of Shah Manfour, its prince, and the extirpation of his male progeny, he advanced from Shiraz to the Persian gulf, and exacted from the rich city of Ormuz an annual tribute. He then proceeded as a conqueror through the whole course of the Tigris and Euphrates from their sources to their mouths, entered Edessa, and reduced the Christians in the mountains of Georgia. Retaliating upon the Geze the invasion of his country, he passed the Shihon, and subdued the kingdom of Caffgar. In his several expeditions he penetrated as far as 480 leagues to the N.E. of Samarcand, and his emirs crossed the Irritift into Siberia, another scene of his adventures and conquests near Kipzak or Western Tartary. Having entertained at his court Tottamish, a fugitive prince of that country, he sent him back with an army which established him in the Mogul empire of the North. Tottamish, however, after a reign of ten years, unmindful of his obligations to his benefactor, entered Peria with a mighty army, pillaged the Shihon, burnt the palaces of Timour, and reduced him to the necessity of contending for his capital and empire. His triumph was of no long duration; for Tottamish was defeated, Kipzak was invaded, and Tottamish was again encountered and routed. This pursuit led Timour to the tributary provinces of Ruffia, and a duke of the reigning family was made captive on the ruins of Yeletz, his capital. Timour then marched southwards, and having pillaged, reduced to ashes the commercial city of Azoph, and also those of Serai and Atfrachan. Under the influence of that ambition which was his ruling principle, he determined, in 1398, on the invasion of Hindoostan, and taking advantage of the rebellion against the weak Sultan Mahmood, he led an army of 62 squadrons, each of 1000 horse, and found great difficulty in traversing one of the snowy ridges between the Jihon and the Indus. Having crost the Indus at Attock, he entered the Panjab, and formed a junction with one of his grandsons, who had reduced Moultan. He then advanced towards Delhi, and having overthrown the army of Mahmood with its elephants, took possession of the capital, which he defolated by pillage and massacre. In this part of his march he manifested his religious zeal, by destroying infidels and idolators without mercy, and having passed the Ganges about 100 miles N.E. of Delhi, he slaughtered a great number of the Guebres, or fire-worshippers. Whilft he was thus engaged, he received intelligence of the disturbances that had occurred on the confines of Georgia and Anatolia, of the revolt of the Christians, and of the ambitious projects of the Turkish sultan Bajazet. Having issued orders to his commanders, he hastened back to Samarcand; and after a short interval of repose, he proclaimed a seven years' expedition to the western parts of Asia. In the year 1400 he began with the Georgian Christians, and soon reduced them to the alternative of tribute or the Koran, and to prisoners he allowed no other choice but death or abjuring their religion. Returning from this warfare, he gave audience to the embassadors of Bajazet, and after some time spent in mutual complaints and menaces, Timour laid siege to Siwas or Sebastie, on the borders of Anatolia, which he took and destroyed, burying alive with savage cruelty the Armenian garrison of 4000 men. He then invaded Serbia, and advanced towards Aleppo, from which he issued a numerous and well-appointed force to engage his army, the front of which was covered by a line of Indian elephants, carrying turrets filled with archers and
and Greek fire. This formidable host threw the Syrians into disorder, and they fled with precipitation into the city, whether the enemy accompanied them. Timour soon became master of this opulent capital. While the streets were trembling with blood and refounding with cries, the conqueror held a theological conference with the doctors of the law; protesting, towards the close of his harangue, that he was not a man of blood, that he was not the aggressor in any of his wars, and that his enemies brought upon themselves the calamities they suffered: at the same time his soldiers were piling up a certain tale of heads of the enemy, in conformity to his orders, which, according to his custom, were afterwards piled up in columns and pyramids. From Aleppo, Timour proceeded to Balbeek, which he took, and then advanced towards Damascus. The sultan of Egypt had made great preparations for the defence of the city, and also for the affailement of the invader; but the plot of using poisoned daggers was discovered. The sultan pretended submission, and thus intended to put Timour off his guard; in the accomplishment of this artifice, the camp of Timour was suddenly attacked by the Syrian army, and thrown into disorder; but as soon as order was restored, the Syrians were repulsed, and driven to the gates of Damascus with great slaughter. The sultan in the mean while had returned to Egypt, and the city was left to make the best possible terms with the conqueror. During a truce, the soldiers broke into the city, massacred a great part of the inhabitants, and made captives of the reft, carried off a great quantity of rich plunder, and the city was reduced to ashes. Bagdad was the next place of importance to which Timour directed his views. Here Timour attended in person, and ordered a blockadé; after 40 days' defence on the part of the inhabitants, a form was commanded; and the death of some of the affailants was avenged by a massacre which produced a pyramid of 90,000 heads. The city was completely razed, with the exception of mosques, hospitals, and colleges. Timour's next object was the Ottoman empire. Having confounded the court-astronomers, and obtained a favourable answer, he put himself at the head of an almost innumerable force, and moved from the Araxes through Armenia and Anatolia, determining to carry the war to the heart of his rival's dominions. By his rapid advances, he invaded Angora before Bajazet was apprized of his movement. Upon receiving this intelligence, the Ottoman hastened to its relief with a very large army. An engagement ensued, and the contest, which was very sanguinary, was at length decided by the defeat and capture of the Turkish emperor. This battle was fought in July 1402. Bourfa, Nice, and Smyrna were successively captured with the fame circumstances of cruelty that marked the progress of Timour's arms.

Timour's conquests were extended from the Irititch and Volga to the Parthian gulf, and from the Ganges to the Archipelago; and beyond these limits his name was a found of terror. Several princes purchased his favour by tributes, or by extraordinary tokens of respect. His want of shipping prevented his entrance into Europe. From his various expeditions, Timour did not return to Samarcand until the summer of 1404. In that capital, he displayed his magnificence and power in dispensing rewards and punishments, attending to the complaints of his people, erecting palaces and temples, and giving audience to ambassadors from Egypt, Arabia, India, Tartary, Russia, and Spain. Although he had professed satisfaction with the extent of his empire, yet he indulged a project of ambition of very great magnitude, which was that of the conquest of China. His preparations for this grand expedition were proportioned to its magnitude: 200,000 veteran soldiers were mustered, and they were furnished with means for conveying necessaries over the deserts which separate Samarcand from Pekin. The aged emperor mounted his horse in the winter fadon, crossed the Sihon on the ice, and advanced to the distance of 500 miles from his capital; but at the camp of Otrar he was seized with a fever, which fatigued, and the imprudent use of iced water, soon rendered mortal. He was not unappricized of his danger; and having summoned round him his empresses and principal emirs, he declared his grandson Mehmet Jehan Ghir his universal heir and successer, and exacted an oath of obedience to him. He thus expired April 14, 1405, in the 70th year of his age, and the 35th from his elevation to the throne of Zagatai. He left 53 descendants, and his posterity are to this day invested with the title of the Mogul emperors, although the power and dominions have passed into other hands.

His person and character are described by one of his biographers in the following terms: 'Timour was tall and corpulent, with a wide forehead and large head, a pleasing countenance, and fair complexion. He had broad shoulders and strong limbs, but was maimed in one hand and lame of the right side. His eyes were full of fire; his voice was loud and commanding; his constitution hardy and vigorous; his understandings found; and his mind firm and itself. In conversation he was grave and modest, and he prided himself in an attachment to truth. He delighted in reading history, and in disputing topics of science with the learned. His religion was fierce and fanatical, and he actually had, or affected to have, the superstitious reverence for omens, prophecies, saints, and astrologers, which is general in the East. He conducted his government alone, without favourites or minions, and its spirit was absolute and uncontrolled. It was his boast to have introduced security and order throughout his wide dominions, and he challenged the praise of a benefactor to mankind; but no conquests have been attended with greater destruction of human lives, and greater devastation of flourishing cities and districts, than his were; and his ambition prompted him to extend his authority beyond the possible limits of a single government. He was not, however, a mere barbarian conqueror; but, if his institutions can be relied on as genuine, had enlarged ideas of the administration of a great empire.' The "Institutions of Timour" have been made known in Europe by two translations from a Persian version: one in English by major Davy and professor White, Oxford, 1783; and the other in French, by M. Langles, Paris, 1787. Mod. Univer. Hist. Gibbon's Rom. Emp. Gen. Biog.

TIMOURKENG, or Fortres of Iron, in Geography, a town of Thibet; 60 miles W.N.W. of Latac. TIMPALU, a town on the W. coast of the island of Cebes. N. lat. 1° 10'. E. long. 119° 40'. TIMPANO, Ital., a kettle-drum. See Tympanum and Tymbales.

TIMPE, or Tymphe, in Coinage, an old silver coin of Poland. The tyrpe, or tympe, was reckoned at eighteen groschen, and the florins were valued at thirty groschen.

TIMURCOUGH, in Geography, a town of Thibet; 54 miles W.N.W. of Latach. N. lat. 35° 12'. E. long. 77° 12'. TIMUS, in Ancient Geography, a town of Asia Minor, destroyed by an earthquake.

TIMYKA, a town of Asia, in Iriaia.

TIN, Stannum, Jupiter, a whitish metal, fiftier, leafy elastic, and leafy sonorous, than any other metal, excepting lead. In the Chaldee language, 3131, tin signifies sile, mud, or dirt; and
and when the Phœnicians came into Cornwall, and saw this metal in its ancient bumpy state, they called it "the mud;" and hence, some have said, the name tin, in Corn-British flon, is derived. Some of the ancients called it plumppum album, white lead, probably to distinguish it from common lead; not knowing that it was radically another metal.

This metal, denominated κασσίτηρ by the Greeks, and flanum by the Latin, seems to have been known from the most remote ages. It is mentioned by Moses; see Numbr. xxxi. chap. 22. It was transported to the East from Spain and Britain by the Phœnicians, with which nations they are said to have carried on a lucrative commerce. Homer mentions it; and by Aristotle, the epithet Κασσίτηρ, or Καστίς, is applied to it, indicating plainly the country from which it was procured. See Tin-Trade of Britain.

Tin-Stone, in Mineralogy, is the most common ore of tin, and is nearly a pure oxyd of that metal. The colour is brown, which passes from a blackish-brown to black, and from a red-brown to yellowish and greenish-white. It occurs crystallized and amorphous, and in grains and rolled pieces, varying from the magnitude of a grain of sand to that of an egg, or larger. The primitive form of the crystal is a flat octahedron: the angles are 112° 12′ and 65° 50′. The figure of the crystals is seldom perfect; sometimes a rectangular prism is interposed between the pyramids that form the octahedron. The edges and summits of the crystals are frequently bevilled or truncated, from which a great variety of secondary forms is derived. The crystals are also frequently united, forming compound crystals or macles: indeed, so numerous are the secondary crystals of tin, that more than one hundred and eighty forms of single crystals have been observed, besides the compound crystals, of which there is a considerable variety. The surface of the crystals is commonly smooth and splendid, but is sometimes streaked. The structure is laminar, but the laminae are rarely vifible. The fracture is uneven and imperfectly conchoidal, with a more or less shining and roughish lustre. When the laminar structure is displayed, the lustre is highly splendent. The crystals are semi-transparent or opaque, the darker colours being opaque, the lighter sometimes nearly transparent; and the intermediate shades are only translucent, or translucid at the edges. The streak is a greyish-white. Tin-stone is hard, scarcely yielding to the knife, and giving sparks with flint. It is brittle and heavy. The specific gravity varies from 6.759 to 6.970.

Before the blowpipe it decrepitates, and becomes paler; when finely pounded and mixed with borax, it is reducible on charcoal to the metallic state.

Tin-stone contains the following constituent parts, according to Klaproth:

<table>
<thead>
<tr>
<th>Component</th>
<th>Form Alphaen.</th>
<th>Schillerwald.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tin</td>
<td>77.50</td>
<td>75</td>
</tr>
<tr>
<td>Oxygen</td>
<td>21.50</td>
<td>24.50</td>
</tr>
<tr>
<td>Iron</td>
<td>0.25</td>
<td>0.50</td>
</tr>
<tr>
<td>Silex</td>
<td>0.75</td>
<td></td>
</tr>
</tbody>
</table>

Some analyses of tin-stone give from two to three per cent. of alumina. The tin-stone of Cornwall, dressed in the common manner, is reckoned rich if it yield 65 per cent. of tin. Tin-stone may be distinguished from wolfram by its superior hardness, as it gives sparks with flint, but wolfram yields easily to the knife. The powder of tin-stone is a greyish-white, that of wolfram a reddish-brown. It is distinguished from blende by its superior hardness, and its not emitting a sulphurous odour when pounded. By its greater specific gravity and lustre, it may be distinguished from garnet; and from felspar, by its colour, lustre, form, and higher specific gravity. This ore occurs in veins and beds, and differmated in granite rocks. The veins intersect rocks of granite, gneiss, mica-slate, and slate: tin-stone occurs also in alluvial soil in the districts that contain tin-veins. See Stream-Tin.

Wood-tin is a species of tin-stone, or oxyd of tin, found with fire-stone in rolled pieces, which are wedge-shaped or reniform, and sometimes globular. The structure is diversely fibrous, with concentric laminae; and from the supposed resemblance to the transverse section of fine-grained wood, it received its name. The colour is commonly hairbrown or wood-brown, passing into yellowish-grey. The lustre is glimmering or silky. It is opaque, hard, and brittle: the specific gravity is 6.450. It is infusible before the blowpipe, but is changed to a brownish-red colour. When strongly heated in a charcoal crucible, it yields about 75 per cent. of metallic tin. The constituent parts are, according to Vauquelin,

<table>
<thead>
<tr>
<th>Component</th>
<th>Analysed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxyd of tin</td>
<td>91</td>
</tr>
<tr>
<td>Oxyd of iron</td>
<td>9</td>
</tr>
</tbody>
</table>

In Cornwall, this ore is almost always found with fire-stone, and never in veins: it is said, however, to have been recently met with in cellular quartz, but in very minute pieces. It is one of the most common ores of tin in Mexico, and occurs in veins that traverse a porphyritic trap, and also in alluvial depositions. In some wood-tin, there is a small, black, smooth globe, from which, as from a centre, the Fibres diverge: this has received the name of bird's-eye tin. Wood-tin, in its structure and mode of formation, probably bears a near analogy to the kidney-shaped hematite iron-ore.

Bell-metal, Tin Pyrites, or Sulphuret of Tin, is an extremely rare ore of this metal, being found only in Cornwall, at Huel rock, in a vein accompanied with sulphuret of zinc and iron. Its colour is fleazy-grey, passing into yellowish-white: it has a metallic lustre, and granular uneven fracture: it yields easily to the knife, and is brittle. The specific gravity is 4.350. It fuses into a black flag before the blowpipe, exhalting at the time a sulphurous odour. It communicates a yellow or green colour to borax. The constituent parts differ in different specimens; according to Klaproth, they are as under:

<table>
<thead>
<tr>
<th>Component</th>
<th>Analysed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tin</td>
<td>34</td>
</tr>
<tr>
<td>Copper</td>
<td>30</td>
</tr>
<tr>
<td>Iron</td>
<td>3</td>
</tr>
<tr>
<td>Sulphur</td>
<td>25</td>
</tr>
<tr>
<td>Earthy matter</td>
<td></td>
</tr>
</tbody>
</table>

Klaproth observes, that the darker varieties of this ore are considerably poorer in tin than the lighter, but the proportion of iron increasest.

Analysis of the Ores of Tin.—The analyses in the dry way were made by Klaproth in charcoal crucibles in the following manner, in which the results were always found to be constant. The ore was broken, and well cleaned from the matrix. One hundred grains were introduced into the cavity of a charcoal crucible, closing its orifice with a flopper of charcoal. The charcoal crucible was then fitted close into one of baked clay, and placed upon the forge-hearth before the nozzle of the bellows. The contents in the charcoal crucible were reduced to the metallic state by exposing it to a strong blast for half an hour. The button of metallic tin produced was a little blackish on the sides, and
and its surface coated with a greenish crust. From one hundred grains of Bohemian tin-flour, seventy-two grains and a half of tin were produced. Wood-tin and stream-tin were treated in a similar manner. Brown tin-flour, exposed to a porcelain fire in a clay crucible, formed a clear dense glass, greenish-grey in the middle, but of a bright yellow on the sides and top. The interior of the vessel was glazed, of a milk-white, and overlaid with many small groups of needle-shaped crystals of a light-brown colour. The inner surface of the lid was lined with similar crystals.

Analytical of Tin-Stone in the humid way.—To Klesproth we are indebted for the discovery of a simple and effectual mode of analysing tin-flour in the humid way. Boil 100 grains of this ore, finely pounded, with a solution of 600 grains of caustic potash. Evaporate to dryness, and then ignite the mass moderately for half an hour. Add boiling water, which dissolves the principal part of the mass, and the residue must again be ignited with six times its weight of caustic potas, and dissolved in water, as before. Add this to the last solution, and saturate the whole with muriatic acid, which will throw down an oxyd of tin. Let this be re-dissolved by an additional quantity of muriatic acid, and precipitated again by carbonate of soda; when liquified, and dried in a gentle heat, it acquires the form of bright-yellowish transparent lumps. This precipitate must be finely powdered, and once more dissolved in muriatic acid, diffused by a gentle heat. The insoluble part consists of silex. Dilute the solution, which is colourless, with from two to three parts of water, and introduce a thick of zinc, round which the tin will collect in a metallic flake in the form of delicate dendritic lamine. Scrape off the tin, wash, dry, and fuse it under a cover of tallow in a capsule placed on charcoal. A button of fine metallic tin will remain at the bottom, the weight of which, deducted from that of the ore, indicates the proportion of oxygen.

Analytical of Bell-metal Ore, or Tin Pyrites.—To two drachms of finely powdered ore, add one ounce of muriatic acid, and half an ounce of nitric acid: this will dissolve the greater portion of the metallic part without heat, but a gentle heat must be applied to dissolve the whole. The sulphur will float on the surface of the solution, and separate by filtration. To the solution add carbonate of potash, which produces a greenish precipitate; let this be dissolved in diluted muriatic acid, and introduce a cylinder of pure tin, the weight of which is to be previously ascertained. By this means the copper will be separated in a metallic flake. The cylinder of tin must now be carefully weighed, and the quantity which it has lost must be noted, and a cylinder of zinc must be introduced into the foregoing solution: this will separate all the tin, which must be melted with tallow and weighed. Deduct the quantity of tin which was lost by the cylinder, and the remainder will be the quantity of tin from the ore, held in the solution.

The sulphur separated by the first filtration must be ignited, and the unconfumed residue, dissolved in nitro-muriatic acid, must be added to the solution, in order to obtain the whole of the contents. The undissolved part will be the sileceous matrix.

The copper may be briskly digested in nitric acid, which will leave behind a minute portion of oxyd of tin, and afterwards the precise quantity of pure copper contained in the ore.

The method of getting, preparing, &c. the tin in the Cornish mines, much the best and most confiderable in the world, is given us in the Philoephalical Transactions, Abr. vol. ii. p. 569, &c. and more distinctly and fully in Pryce's Mineralogy. Vol. XXXV.

The working of the tin-mines is very hard and difficult, not only by reason of the great depth which the veins descend to, even as low as sixty fathoms; but also because the rocks, through which passages are frequently cut, are extremely hard. Nor is the soft shakking earth found in the tin-mines much less inconvenient to the workmen, both by reason of the fetid, malignant vapours it exhales, and of the current of water often met with in them: these disadvantages often render it impracticable for the workmen to hold it above four hours together.

The existence of native tin has been always doubted, and till of late absolutely denied by all mineralogists, both ancient and modern: however, Mr. Borlase, in his Natural History of Cornwall, p. 185, suggested, that its existence was far from being improbable; but he afterwards discovered three specimens of this metal, native or pure, of which he presented an account to the Royal Society. Mr. Mendes da Costa made several experiments on one of these specimens, with a view of proving that it was really tin; from which he infers, that it is perfectly ductile and malleable; and being bent between the teeth, gives the same cracking noise as tin always does: in an open fire it melts easily, calcines on the surface, and smokes; but forced in a stronger fire with borax, it detonates with small phosphorescent sparkes, which is a property of pure tin; and it is only corroded to a white ashes in spirit of nitre, and oil of tartar, of deliquium being added to the solution, none of it was precipitated: whence he concludes, that it was pure tin. Phileol. Trans. vol. ivi. art. 7. 39. Native tin is also said to have been found in Saxony and Malacea.

The ores of tin may be generally classed into shoad, stream, and bald or mine tin. The shoad is disjunct, and scattered to some distance from its parent lode, and is pebbly or smoothly angular, of various sizes, from half an ounce to some pounds weight. See Shoad.

Stream-tin ore is the same as shoad, but smaller sized, &c. See Stream-Tin and Streaming.

Bal or mine tin-ore often rises very rich; and influences frequently occur, in which it has been discovered in the richest and purest state imaginable. This kind of rich ore consists of the blackest grains or cralysts, and is usually found at a moderate depth, or within the day-side of forty fathoms.

When the tin-ore is raised, or dug and drawn out of the mine, and laid by the shaft, it is first spalled, as the process is termed, which consists in braking it into smaller fragments, and separating it from the worthless parts. When the best parts are sorted, they are divided into heaps by a hand-barrow, containing a sack and a half, or eighteen gallons. Each of these shares, called doles, being turned over, equally levelled and mixed, is then divided with a shovel into two equal parts; and after being bruised by large fedges to the size of a hazel-nut, is equally levelled and divided into four parts: the bruising and divisions are repeated at pleasure, till the quantity designed for sampling is well mixed, and made as fine as common sand. To make a rough guess, or coarse essay, the sampler takes a handful of it, and washes it on a shovel, till the impure parts are carried off by the water, and the more solid and heavy particles, that are left behind, are bruised with a fledge on the shovel, till the whole assumes the appearance of mud. This is again washed, and by a peculiar motion the metallic particles are collected together on the fore-part of the shovel. By repeating these brisings, washings, and motions, it becomes clean black tin, fit for the smelting-furnace. This is called a shon, (probably from the French avant, foremost,) as it is thrown upon the point of the shovel by the dexterity of
of the sample titer. After the tin is thus cleaned, it is
dried; and if there be as much black tin as will cover a
shilling, or equal to the weight of a shilling, it is called a
scilling wav, which is not rich; but if the van will cover or
equal the weight of a crown-piece, it is good tin-fluff, and
called a crown van. The shilling van, the tinners say, will
produce one hundred avoidance weight of block or white
tin; and the crown van will yield five hundred weight of
block tin, for every hundred sacks in measure of the respec-
tive doles from which the sample or van was taken, and to
in proportion, to the richest tin-fluff, called fowel, which
is reckoned at the rate of ten thousand of white tin-metal
for every hundred sacks. But a better judgment may be
formed from the measure of a wine half-pint, than from a
handful, which is indeed accounted a half pint. When the
tin, thus measured, is reduced clean, and to a proper fize,
by using a large hovel, and taking off the fixed tin on an-
other hovel, the van is dried in a hovel upon the fire, and
then weighed by pennyweights and grains; and for every
pennyweight and half the faven, the weights, will produce
be one hundred weight of black tin for every hundred sacks
of tin-fluff; and for three pennyweights, two hundred weight,
&c. in the fame proportion; and if be tin worth ten for
twenty, or one for two, then the tin-fluff is valued at five
hundred weight of block or white tin for every hundred
sacks: if it be worth twelve for twenty, the fluff is valued
at five hundred weight of white tin a hundred; or if it be
worth only eight for twenty, it is only valued at four
hundred weight of white tin a hundred, &c. This black tin is
rather of a liver colour, though called black in contra-
diffinition from white tin, or the metal produced from this
black ore; it is very heavy, and may in general be com-
cuted to hold one-half clean metal, and fome of it will pro-
duce thirteen, or even fourteen parts in twenty; whence
the mode of expressing so much white tin for twenty of
black tin, i.e. eight for twenty, ten for twenty, twelve for
twenty, &c. Thus, if the van of one hundred sacks
of tin-fluff weighs six pennyweights, being four hundred
weight of black tin at twelve for twenty, the white tin or
metal must be two hundred weight one quarter sixteen
pounds.

In this method of sampling, the tinners form a near
conjecture of the quantity of white tin which thofe doles of
tin-fluff will produce at the melting-house, when it is
dressed, and brought into black tin. But if the black tin is
combined with any bad mixture, as of mock-lead, copper,
or munde, after the van is brufed fine and wathed, they
lay the hovelf over the fire, and burn the black tin, flirring
it continually, till it has done foaking: they then wafh
it again on the hovel, and thus the heterogeneous matter,
becoming light by being burnt, is carried off by the water:
for when black tin is calcined or burnt, it still retains its
specific gravity; but copper, lead, and other crude mine-
als, become much lighter by torrefaction, and are easily
separated from the tin by water. In the dressing and ma-
agement of tin by flamping, &c. there are obtained two
forts of black tin, viz. the crop and rough, or the crop
and leavings of tin. The firft is the prime tin; immedi-
ately separable from the bafer parts by its superior weight
and riches. The latter is that which is carried off, and
mixed with the lighter earthy parts, by being under fize,
and, therefore, more eafily carried off by the water.
The tin-fluff, after this previous preparation and adjuf-
tment, is carried to the flamping-mill, in order to be dried
or pounded.

This operation of pounding in the flamping-mill is effen-
tial to the complete preparation of the ore from the matrix,
through which it is diffaminated. If full of fame, it is
thrown into a pit, called a buddle, to wash away the earthy
matter, and render the flamping more free, without choking
the grates. The ore is flowed into a kind of floping
channel of timber, called the pafs, whence it flides by its own
weight, and the affifiance of a small stream of water, into
the box where the lifters work: the lifters are raised by a
water-wheel, and are armed at the bottom with large
mallets of iron, weighing nearly two hundred weight each;
these pound or flamp the ore sufficiently to enable it to
pafs through the holes of an iron grate fixed at one end
of the box. To affift its pulvcrization, a rill of water keeps
it continually wet, and it is carried by a small gutter into
the fire-pit, where it makes its first deposition; the lighter
particles running forward with the water into the middle
pit, then into a third, where what is called the flame settles.

(See Drefling of Ores, and Buddle.) From these pits
the ore is carried to the kewe, which is a large vat containing
water; in which it is farther purified by an operation
termed packing, and which confifts in beating the upper
part of the contents with mallets for fonie minutes, by
which the lighter particles are kept fupended, while the
the tin-ore, from its great fpetic gravity, subsides. The wafer
is flimmed and laid by, to be again buddled, under the
name of the flimpings. The tin is lifted through a copper-
bottom fieve into another kewe of water, by which the
gravelly wafte still remaining is separated from the clean tin;
and the tin that runs through the fieve, if it requires no
farther buddling, may be cleaned by repeatedly toffing
and packing it as before. If it be neccafary to buddle it again
after it is lifted, let it be buddled and distributed in three
parts, viz. the crop or pureft, the creaft or next i in purity,
and the hind-crest or tail, which is the moft impure. The
crop is to be cleaned by toffing, &c. and the creaft muff
be buddled again, and out of this muff be referved as much
as may be cleaned by toffing and packing. The remainder
must be cleaned by an operation called dillingeigh, from
dilliegh, to let go, or fend away. A dillingeigh is a large
fine hair-fieve, which the dredger holds in a kewe one-third
full of water, into which the tin is thrown by a fhovelful
at a time, and which is fhook so as to put the tin into
motion: one fide of this dillingeigh is dipped in water,
and raised again in fuch a manner, that the wafte may run over,
which is laid afide to mix with the flimpings, to make the
samples of low value, called the rough (or raw) tin. This
ufually undergoes another operation, in which, by a rill of
water passing over the buddle in which it is placed, it is
farther cleaned, and then dillingeighed, fo as to be fit to mix
with the crop-tin.

Upon the fame mechanicall principle of feparation, the
timer is capable of efimating the value of a fample of ore.
For this purpose, the ponded tin-ore, or tin-fluff, as it is
called, is placed on a fhovelf and washed under a ftream,
till the impure earthy parts are carried off by the water from
its fides, when, by a particular and dexterous motion, not
eafily defcrib'd, all the metallic particles are collected to-
gether on the fore-part of the fhovelf: this operation is
called vanning, which we have already defcribed.

When the tin-ore is contaminated with the different pyri-
tous ores of copper, arfene, and iron, it is firit roafed in
a burning-houfe, and then washed in water, by which means
the tin, which is heavy, is eafily feparated.

By this procfs, as at prent conducted in Cornwall, a
considerable quantity of copper is left; for being converted
into fulphate of copper, which is folution in water, it is left
by washing: whereas, if the roafed ore were fuffered to
remain in a close pit for a few days, and the water drawn
off
off into another pit, the copper might be separated by iron in a metallic flake.

The leavings of tin, consisting of the flame and tails, i.e., of tin-mud and tin-gravel, are dressed by a particular kind of apparatus, for the construction and use of which, we must refer to Pryce’s Min. Corn. p. 226, &c.

Each flamping-mill, which has constant work and water, will employ one man and five boys; and one hundred sacks are carried, flamped, and dressed, in the space of a few days, at the average rate of about four-pence per sack, or one guinea and a half per hundred.

When the tin-ore is brushed, it is divided into as many shares as there are lords and proprietors.

The next operation pertaining to tin-ore, or black tin, is that of smelting it. The Phoenicians, who traded to Cornwall for tin in the earlier ages, probably conducted this process by digging a hole in the ground, and emitting the ore on a charcoal fire, which perhaps was excited by a bellows. But having no idea of confining the fire, and directing its force on the substance to be smelted, they made no use of furnaces, either simple or reverberatory. Charcoal was long used in the operation of melting, till at length necessity suggested the introduction of pit-coal; and in the second year of queen Anne, a patent was granted for melting black tin with fossil coal in iron furnaces. The invention of reverberatory-furnaces built with brick, stone, sand, lime, and clay, soon followed this discovery: the form of which, being simple, has admitted of little improvement to the present time. The charge for one of the tin smelting-furnaces is from five to fix hundred weight of black tin, well mixed with a tenth or twelfth or eighth weight of culm, which is a species of coal from South Wales, that is very free from sulphur. The furnace is charged through a hole in its side with a shovel, and the tin levell’d over the bottom with an iron rake or paddle. The apertures are then closed, and the fire raised to a very great strength, in which state it is left for four or five hours, when the door is taken off, and the whole charge well stirred together. The flake of the metal is examined, and more culm thrown in if necessary; the furnace is again closed, and the fire kept up till the end of about fix hours from its receiving the charge; when it is again examined, and if proper, it is then tapped, and the metal let out into a fixed bason made of clay, and large enough to hold somewhat more than the metal of the charge. The scoria in the bottom of the furnace is raked out at the mouth into a small pit made for this purpose, where it generally forms itself into a cake. When cold, it is carried to the flamping-mill, in order to separate the globules of melted tin disseminated through the scoria or flag. This, being broke by hammers to the size of goose eggs, is put into the first flamping-mill, and passed through small iron bars; by which means the pillon (for so all tin recovered out of the flags is called) of the larger size is taken out and prevented from choice by too much flamping. The refuse of this first flamping is put into other flamping-mills of a second, third, or even fourth size. Of the pillon, separated from the scoria, all the rough or grainy parts are considered as metals, and refined accordingly, by being smelted without any flux, and the produce of this smelting refined, with the tin first tapped.

The tin in the bason, or float (as it is called), as soon as it comes down to a moderate heat, is lided out into the moulds, in slabs or pigs of about three-fourths of a hundred weight.

The method of smelting in Saxony and Bohemia, does not differ greatly from that practiced in Cornwall. When the ore has been roasting it is walked upon tables, to separate the oxyd of iron and the oxyd of copper, which are lighter than tin-ore. At Alt-Saint-John, the oxyd of tin is mixed with the black oxyd of iron; this is separated by a powerful magnet, which is drawn over the table. That the powdered oxyd of tin may not be blown away by the blast of the furnace, it is previously moistened with water; but as the flame always carries away a part of the ore, a chamber is constructed about the middle of the chimney, made of wood lined with clay, where the powdered ore that has been driven up by the flame is deposited.

The next process is that of refining. The furnace having, by the side of the small float now described, a larger one capable of holding twenty, or more blocks, is for this purpose suffered to cool to a certain degree, and then charged full with the slabs just mentioned, the tap-hole being kept open, so that as the tin melts in this moderate fire, it makes its exit through it to the float; where, while running out, it is frequently stirred and tossed by a ladleful at a time held arm-high, letting it fall in a stream into the masts of metal, when the scum which arises is taken off. While the metal already put into the furnace is melting, more is added, so as to be just enough to fill the float with good tin: and this, after being tossed and skimmed as before, and suffered to cool to a proper temper, is carried in iron ladles to moulds holding generally somewhat above three hundred weight (then denominated block-tin), where they are marked as the smelters chafe with their house mark, which may be a pelican, plume of feathers, flag, or horse, by laying brads or iron flamps, in the face of the blocks while the tin is in a fluid state, and yet cool enough to sustain the flamping iron. The blocks are then ready to be weighed, numbered, and sent to the nearest coinage town to be coined. The privileged towns for coinage of tin, were anciently Liskeard, Lostwithiel, Truro, and Helston: but soon after the Restoration, Penzance was added to the number; in which last place there is every quarter more tin coined than in the towns of Liskeard, Lostwithiel, and Helston, for a whole year. When the tin is brought to be coined, the assayer’s deputy assays it by cutting off with a chisel and hammer a piece of one of the lower corners of the block, about a pound weight, partly by cutting and partly by breaking, in order to prove the roughness of the metal. If it is a pure good tin, the face of the block is flamped with the duech feal, which flamps is a permit for the owner to sell, and at the same time an assurance that the tin so marked has been examined and found merchantable. The flamping of this impression by a hammer is coin’g the tin, and the man who does it is called the hammer-man. The duech feal is argent, a lion rampant gules, crowned or, with a border garnished with bezants.

The dropp’d part remaining in the furnace is by an increasing fire wholly melted, which is then tapped into the small float, where the tin subding, and the drops rising to the top, the latter is taken off, and the tin laded into small slabs, as at first, to be again refined. The tin that remains in and about the scoria and dro’s of the last tappings, &c. is recovered by repeated smelttings, till at last, being almost entirely drained of that metal, they become what the workmen generally call hard head, and esteemed of no further value.

M. Grosch, in the Memoirs of the Academy of Sciences of Paris, has delivered a method he had invented of separating tin from lead or silver. Having tried an experiment on the scoria of metal, which contained with the tin a large quantity of silver, it seemed to him that one great step toward the separation of the silver, was the haftening of the calcination of the tin, and with this view he tried a mixture

4 T 2
of charcoal, saltpetre, and earth, which he put together
into the coppel with the fcorze. It is easy to see that a de-
tonation would happen from this, and this must greatly add
to the force of the fire, in acting upon the fcorze, while the
ferruginous matter well known to be contained in the char-
coal mixed itself with the tin, and must greatly accelerate
its calcination, divide its parts, and give the fire a new action
over it. The confequence of this perfectly answered expec-
tation, and recovered a large quantity of filver from the 
scorze, in which the tin had before held it firmly imbedded;
repeated experiments proved the truth of this obervation,
and it was found to be easy by this means at any time to se-
parate filver from tin, or to purify filver without loss, by
means of lead in which tin has accidentally been imbedded.
The fcorze in which tin is mixed with filver, are com-
pared of tin half calcined, and run into an opaque vitrified
fublimate, which forms a sort of net-work, in which the
filver is confined in extremely small particles. If this is
thrown into aqua fortis, the water is dissolved; but then it
requires a very strong fire to make the tin loft its metallic
form; finally, if the whole is finely powdered, and then
put into this menstruum, the filver only is taken up or
dissolved, the tin remaining untouched at the bottom of the
veffel.
The fame gentleman found also a method of separating
fiver from tin, by means of corrosive fublimate of mer-
cury. To conceive the manner in which this separation is
effected, a piece of tin need only be call into a folution of
fublimate; in which cafe the acid of the felf-falt is feen
to leave the mercury in order to fix upon the tin.
And, according to the fame principle, if fublimate cor-
rofive be added to a mixture of tin and filver, the fame
efect is produced, the acid affixes itself to the tin, and
makes with it a butyrum joviale or butter of tin, the mer-
cury becomes diffipated in the mean time by the action of
the fire, and the filver remains pure and alone; but in this
experiment, if too much corrosive fublimate be added, there
is danger of lofing fome of the filver; fince the abundant
acid will prey upon and carry off a part of that metal,
making a fort of luna cornex which diffipates itself in the
air, or if the operation be performed in a clofe veffel, a
butyrum luminare.
Gold may also be purified from tin in this manner, and in
this there is no rilk of losf, fince the acid which takes up
the tin has not the leaf power over that metal: in all these
proceffes, however, the operator must avoid the fames iffin-
ging from the crucible, far they are very dangerous.
These methods of separating of tin from filver are very
certain and infallable, but they are too expeffive to be em-
ployed in common, and in larger works.
The separating of tin from lead to be employed in the
refining of filver is a matter of great importance; and this
may be done in the following manner: melt the lead, and
when in folution throw into it a quantity of filings of iron,
then inceafe the fire to a considerable degree, and the sur-
f ace of the metal will be covered with a fort of feum, which
is no other than the iron and tin. At this time there should
be a little alkali falt thrown in, and by this means the fcorze
readily separate themselves, and the pure lead remains in
form of a regulus at the bottom. The fame method may be
used to separate tin from filver in the larger way, but it
will be neceffary for this purpofe to add fome lead; fince
otherwise the folution will be very flow and difficult, and the
tin will calcine without separating from the filver. This is
a very easy and very cheap method, and will obviate moft of
the miffakes which happen to the refiners, of which they
would have much ftreas frequent reafon to complain, if they
nicely examined the lead they were to employ. But if gold
or filver be mixed with tin, the shortef method in small
quantities is to calcine the whole very briefly, and in order
to complete the vitrification and seperation of the tin, to
call in a little glafs of lead, which will immediately join itfelf
with it and carry it off from the mafs.
It may feem singular that iron being one of the hardeft
of the metals to melt, and tin being of all the eaffieft, they
fhoild fo readily and eafily unite in these experiments; but
this feems to be the reulf of one of thoie natural and unex-
pected alliances which accident frequently discovers to us in
bodies. There is one conjecture, however, that may be
worthy a place in this refearch, which is, that all tin-ore
contains a quantity of arffenic; and it is well known that iron
very readily mixes with arffenic, and is employed to separa-
tethe arffenic from other ores, and a regulus may be formed
of arffenic and iron. It is eafy to fuppofe that tin is, in its me-
talline form, not wholly divifted of the arffenic it contained
when in the ore; and if this be allowed, it is no wonder that
the two metals are eafily brought together by the medita-
Mr. Cramer gives the practical rules of separating filver
from tin, thus: Divide one centner of tin into two equal parts;
put each of these into a feparate telt, and add to each fixteen
centners of granulated lead, and one of copper; put the
whole under the muffle, and make a very strong fire; the
tin will be calcined immediately, and will fwim upon the lead.
Then inceafe the fire a little, till the affhes of the tin that
fwm upon the surface do no longer fparkle: when you fee
this, add with a ladle two centners of glafs of lead to each
test, in fuch a manner that it may be spread wide over the
whole surface of the refected calx; the calx will then change
its form of powder into that of glafs; then inceafe the fire
to its highest degree, fir up the whole with an iron rod made
warm; and when the fcufpiration is perfected, pour out the
flafs into a mould; the fcorze being feparated, put both
the regulufes into two coppels well heated; and into a third
put fixteen centners of lead, and one of the fame copper
used in the procefs: examine all these beads after the cop-
pelling is over; if the two firft weigh exactly alike, it is a pro-
of the procefs has been well performed; and by subtracting
the weight of the bead, feparated from the third pan, from
the joint weight of the other two, the remainder is the
weight of the pure filver contained in the quantity of tin
which was examined. Cramer's Art of Allaying, p. 228.
Tin is found in Europe, Asia, and America, but has not
hitherto been discovered in the continent of Africa. This
metal is much lefs generally difteminated than gold, filver,
iron, copper, or lead; but where it occurs, it is moft of-
freuently in large quantities. In Asia it is found on the coaft
of Sumatra, and in Siam and Pegu. It is principally im-
ported into our Indian pofteffions from Queda, Jemfelen,
Tavai in Lower Siam, and the inlands of Banca. The tin-
mine of Banca are faid to be of great extent; and Mr. El-
more informs us, that no lefs than from forty to fixty thou-
sand pefuls of tin are furnifhed by these mines annually.
Tin is faid also to be found at a place five days' journey
from Nankin in China. The Indian tin was known to the ancients.
Diodorus Siculus mentions it among the productions of
India. Tin-flone is found in Mexico in the rate of stream-
tin, and is procured from alluvial depofitions by washing.
It is alfo faid to occur in Chili.
Tin-ore occurs in Saxony and Bohemia in beds, and
difteminated in granite rocks; it is found also in veins in rocks
of granite, gneifs, and mica-flate. Alluvial depofitions of
tin are alfo met with in these districts. The mines fometimes
confift of a mafs of ore formed by the junetion of a multitude
of
of small veins which pass through the rocks in different directions. These veins also contain topazes. Brounart Traité Elémentaire.

Tin is found near Monterey, in the province of Galicia in Spain, in veins which traverse granite and mica-flate. This ore has recently been discovered in small quantities in grains and crystallites, in a rock of granite at Puy les Vignes, in the vicinity of St. Leonhard, in the department of Haute-Vienne in France. It occurs in veins with wolfram, arséniac pyrites, and marten arseniate of copper.

The most considerable repository of tin-ore in Europe is that of Cornwall. The greatest part of the tin consumed in Europe is procured from thence; and Camden even supposes this abundance of tin in Cornwall and Devonshire, to have given the original denomination Britain to the whole kingdom. In the Syriac language, carataneane, or bartaneane, signifies land of tin; from which Bochart derives the name Britain. It occurs in Cornwall, both in veins and alluvial depositions, in various parts of the county. Alluvial depositions of this ore are also met with on Dart-moor, in Devonshire. The veins which contain tin interject both granite and slate rocks; the latter are provincially called killet. These veins vary in width, and sometimes contain large masses of the ore. One block was raised from the mine called Polberrow, in St. Agnes, which weighed more than twelve hundred pounds, and produced more than half that weight of pure metal. Tin-flone generally occupies the upper part of veins, and is succeeded by copper-ore; but there are instances of tin occurring at the depth of two hundred fathoms. Different modifications of the forms of the crystallites are peculiar to certain veins. Crytallites of tin-flone are also disseminated in some of the granite rocks in the vicinity of veins: the crystallites appear to occupy the place of mica. Where the tin-flone is disseminated in flate, it is generally in small firings or minute veins. See Mine and Veins.

The workmen distinguish several kinds of tin; as mortin, which is the best sort, a fool of which weighs eighty pounds; and mine-din, which is the next, the fool of it weighing about fifty-two or fifty pounds. The tin got from the loft, gravelly earth, they call pyram-din, to distinguish it from that obtained from the mines, which is better by almost half. See Stream-Tin Ore.

Grain-tin denotes the ore of tin that is sometimes dug very rich in the form of grains or pebbles, or else in larger pieces, composed of many such distinct grains, united in one mass, always of a black or dark brown colour, pointed like diamonds. Grain-tin is also used to signify the purest and finest block or white tin, mixed with charcoal in the blast or blowing-house furnace, which never had any brood or foreign mixture in the mine: whereas the mine-tin is usually corrupted with some portion of mundic, or other mineral, and is always mixed with a bituminous fire, which communicates a harsh fulphurous quality to the metal. Grain-tin is peculiarly produced from stream-work, and is worth several shillings per hundred more than mine-tin. See Streaming.

See on this article Macquer's Chem. Dict. art. Tine; and Pryce's Mineralogia Cornubiensis, fol. 1778.

There is a curiosity in the Cornish mines, which is this: that in digging at the depth of forty or fifty fathoms, they frequently meet with large timbers, full entire.

Childrey, in his Natural History, goes back as far as the deluge to place them there; but, without having recourse to so great antiquity, they who believe that the mines, when exhausted of their ore, or mineral matter, renew and fill again in course of time, will soon solve the difficulty, by supposing that, in the first working of these mines, these timbers had been let down to serve as props and pillars.

But there are other people who will think this renewal of the mines itself a difficulty as great as the former. However, what the former author says, viz. that in some places in the mines they likewise find pick-axes, &c. with wooden shafts, as also brass nails, and that even a medal of Domitian has been found in one, seems to countenance the opinion.

For the use of tin in the composition of pewter, see Pewter.

Tin: Trade of Britain. That tin was procured from Britain in a very early age, appears probable from the concurrent testimony of the most ancient historians. The Phenicians are said by Strabo to have passed the pillars of Hercules, now the straits of Gibraltar, about twelve hundred years before Christ. At what precise period they discovered the Cafiterides, or Tin islands, is unknown, nor is their exact situation determined; but it is generally believed that the Saillies islands, and the western part of Britain, were the places from whence these early navigators procured the tin which they exported to other countries. The Phenicians were extremely anxious to conceal from the rest of the world the true situation of the Caffiterides. Herodotus, who wrote about four hundred and fifty years before Christ, could not learn where these islands were situated; but he supposed that tin, like amber, was brought from the remotest parts of Europe. Strabo relates, that the captain of a Phenician vessel returning from Britain seeing himself pursued by a Roman galley, chose rather to run his vessel among the rocks, that the Romans might experience the like fate, than be the means of discovering so valuable a commerce to the enemies of his country. The captain having escaped from the wreck, claimed from his country compensation for the loss of his vessel and the cargo: and it is said he was paid from the public treasury the amount of his claims. By these precautions, the Phenicians are said to have enjoyed a profitable trade to these islands for about three hundred years. The secret was at length discovered, and the Greeks, Gauls, and Romans, came in successively for a share of this trade. The Phenician Greeks established a colony at Marseille five hundred and forty years before Christ: and after the destruction of Carthage, carried on this commerce; they endeavoured to conceal from the Romans their knowledge of the British islands; for on being questioned by Scipio respecting the situation and extent of those islands from whence the tin was brought, they declared that they were entirely unknown to them. The Phenicians, in their voyage to Britain, are said to have failed from Cadiz to the harbour of the Artabici, near Cape Finisterre, from whence, after four days’ sail, they arrived in Britain. Strabo relates, that Publius Licius Croassus having made fruitless attempts to discover whence the tin was brought, at length succeeded, and arrived in Britain. It is uncertain when this Croassus lived, and even who he was, there being two of this name; the father, who was proconsul of Spain, and the son, who had a command under Cesar in Gaul.

Diodorus Siculus, who wrote during the time of Augustus, appears, from the quotation which we shall subjoin, that in that period, Tin was an article of considerable exchange. He says, Dr. Borlase. Polybius the historian is said to have described it; and that work is commended, Tin: Trade of Britain. That tin was procured from Britain in a very early age, appears probable from the concurrent testimony of the most ancient historians. The Phenicians are said by Strabo to have passed the pillars of Hercules, now the straits of Gibraltar, about twelve hundred years before Christ. At what precise period they discovered the Cafiterides, or Tin islands, is unknown, nor is their exact situation determined; but it is generally believed that the Saillies islands, and the western part of Britain, were the places from whence these early navigators procured the tin which they exported to other countries. The Phenicians were extremely anxious to conceal from the rest of the world the true situation of the Caffiterides. Herodotus, who wrote about four hundred and fifty years before Christ, could not learn where these islands were situated; but he supposed that tin, like amber, was brought from the remotest parts of Europe. Strabo relates, that the captain of a Phenician vessel returning from Britain seeing himself pursued by a Roman galley, chose rather to run his vessel among the rocks, that the Romans might experience the like fate, than be the means of discovering so valuable a commerce to the enemies of his country. The captain having escaped from the wreck, claimed from his country compensation for the loss of his vessel and the cargo; and it is said he was paid from the public treasury the amount of his claims. By these precautions, the Phenicians are said to have enjoyed a profitable trade to these islands for about three hundred years. The secret was at length discovered, and the Greeks, Gauls, and Romans, came in successively for a share of this trade. The Phenician Greeks established a colony at Marseille five hundred and forty years before Christ: and after the destruction of Carthage, carried on this commerce; they endeavoured to conceal from the Romans their knowledge of the British islands; for on being questioned by Scipio respecting the situation and extent of those islands from whence the tin was brought, they declared that they were entirely unknown to them. The Phenicians, in their voyage to Britain, are said to have failed from Cadiz to the harbour of the Artabici, near Cape Finisterre, from whence, after four days’ sail, they arrived in Britain. Strabo relates, that Publius Licius Croassus having made fruitless attempts to discover whence the tin was brought, at length succeeded, and arrived in Britain. It is uncertain when this Croassus lived, and even who he was, there being two of this name; the father, who was proconsul of Spain, and the son, who had a command under Cesar in Gaul.

Diodorus Siculus, who wrote during the time of Augustus, appears, from the quotation which we shall subjoin, that in that period, Tin was an article of considerable exchange. He says, Dr. Borlase. Polybius the historian is said to have described it; and that work is commended.
TIN.

The short description of the tin-trade given by Diodorus Siculus deserves particular attention. "These men (the tinners) manufacture the tin by working the ground which produces it with much skill. For though the land is rocky, it has soft veins running through it, in which the tinners find the treasure, which they extract, melt, and purify. Then shaping it by moulds into a cubical figure, they carry it off to a certain island lying near the British shore, which they call Leitis; for at the recess of the sea between the island and the main land, the passage being dry, the tinners embrace the opportunity, and carry the tin over in carts to the Leitis, or Port; for it must be observed, that the islands which lie between the continent and Britain have this peculiarity, that when the tide is full they are real islands, but when the sea recedes they are so many peninsulas. From this island the merchants bring the tin of the natives, and export it into Gaul; and finally through Gaul, by a journey of about thirty days, to the mouth of the Rhone;" lib. 4. Ptolemaus, as quoted by Strabo, says the port to which tin was brought in the south of France was Marseilles.

To what uses the nations of antiquity applied all the tin which they obtained with so much labour from Britain, is not precisely known. The Phoenicians celebrated for their skill in the art of dyeing; and the Tyrian purple, which was either a bright crimson or a scarlet, was held in the highest estimation; hence it has been conjectured, with much probability, that the Phoenicians were acquainted with the use of the solution of tin in the preparation of that colour. In the modern art of dyeing scarlet or crimson, the solution of tin in the nitro-muriatic acid is essentially necessary to communicate those colours to woollen cloths or stuffs, a practice which is probably derived from the ancient manufacturers of the East.

The mirrors of the civilized nations of antiquity were made of a composition of copper and tin. The most ancient account that we have of these mirrors is that in Exodus, chap. xxxviii. 8. "And he made the laver of brass (a mixture of copper and tin), and the foot of brass of the mirrors of the women." The Jewish women probably received these mirrors from the Egyptians when they left the country; for it was the custom of the Egyptians to carry a mirror in their left hand, when they went to their temples. Cyril de Aodo.

Pliny says that the best specula were anciently made at Brundulum of copper and tin. The metallic mixture of tin and copper, for rendering the latter metal white, is mentioned by Arifotole. (De Mirab.) This composition is still in use for the specula of reflecting telescopes. (See Speculum.) The ancients also made use of an alloy of tin with copper and lead for pot-metal. In the time of Pliny, pot-metal, ollaria temperatura, was made of two pounds of lead, and an equal quantity of tin, mixed with one hundred pounds of copper. From the same writer we learn, that the bronze of which the Romans made their statuettes, and the plates on which they engraved their inscriptions, was composed of one hundred pounds of copper, mixed with twelve pounds and a half of an alloy made of equal parts of lead and tin. He informs us also that tin, plumbum album, was employed in coating or lining copper vessels, to render them more wholesome; and it appears that the Romans not only used pure tin, but the same mixture of tin and lead which some of our workmen use at this time in lining vessels. A mixture of equal parts of tin and lead they called argentarium; a mixture of two parts of lead and one of tin they called tertiarium; and with two parts of tin and one of lead, they tinned whatever vessels they thought fit. (Watton's Chemical Essays, vol. iv.) In the manufacture of arms, the ancients used an alloy of tin with copper, their brases being a composition of these metals; but by what method they were enabled to communicate to it the necessary degree of hardness is unknown.

What was the relative value of tin, compared with that of gold and silver, as estimated by the Phoenicians, the Greeks, or the Romans, is uncertain. The process of extracting tin from its ores was probably very imperfect, and remained so in this country to the time of Elizabeth, when Carew informs us that Sir Francis Godolphin introduced great improvements in the tin-works.

The reverberatory-furnace appears, from Dr. Borlase, to have been introduced into Cornwall about the beginning of the last century; and about the same time the introduction of pit-coal became general, the wood of the country having been nearly exhausted. Sir Bevil Granville had previously made many experiments for melting tin with pit-coal, but without success, when the ore was smelted at the blowing-houses by large bellows worked by a water-wheel.

Whether the Phoenicians or the Greeks interfered themselves in the management of the tin-mines, or whether they were simply merchants purchasing and exporting the tin, is uncertain. It appears, however, by the passage quoted from Diodorus Siculus, that the veins of tin-ore were worked as mines; though it has been, and is still generally believed, that true tin was only ore worked by the ancients. From the testimony of Strabo, Pliny, and others, the Romans not only traded to Britain for tin, but improved the art of mining in Cornwall. The Romans being the conquerors, and the Britons under them having probably little or no property, they were the working miners, but under what regulations is uncertain. The Saxons did not obtain possession of Cornwall till the reign of Athelstan, and neither they nor the Danes appear to have directed their attention to the mines. After the Norman conquest, the working of mines is said to have yielded great profit. In the time of King John, however, the right of working tin being as yet, says Borlase, wholly in the king, as Earl of Cornwall, the property of the miners was precarious and unsettled, and all the tin that was raised was engrossed and managed by the Jews. The tin-farm of Cornwall at this time amounted to no more than one hundred marks, according to which valuation, the Bishop of Exeter received them, and still receives from the Duke of Cornwall, the annual sum of 6l. 13s. 4d., for low was the tin profits then in Cornwall; whereas in Devonshire, the tin was then farmed at 100l. yearly. King John, sensible of the languishing state of the mines, granted the county of Cornwall some privileges, and is said to have also granted a charter to the tinners.

In the time of Henry III. the tin-mines of Spain, which had been worked by the Moors, were stopped, and Cornwall had all the trade of Europe for tin. In the eighteenth year of Edward I., the Jews being banished from the kingdom, the mines were again neglected for want of proper encouragement to labour, and security to enjoy and dispose of the products. In consequence of a petition from some Cornish gentlemen to Edmund, Earl of Cornwall, a charter was obtained with more explicit grants of privileges of keeping courts of judicature, and managing and deciding minster causes. About this time, says Borlase, it appears that the rights of bounding or dividing tin grounds into separate portions, for encouraging the search for tin, were more regularly adjudged, and various laws introduced for the protection of the miner.
In the thirty-third year of Edward I. the above charter seems to have been confirmed, and the tinners of Cornwall were made a distinct body from those of Devonshire, before which time the tinners of both counties were accustomed to meet on Hingston-Hill every seventh or eighth year, to concert the common interest of both parties. Two coinages of tin yearly were also granted by this charter, and the tinners had the liberty of selling their own tin, unless the king insinuated on buying it himself. Other laws and regulations for the encouragement and protection of the miners, were passed in the reigns of Edward III., Henry VII., and Elizabeth. The mines having been much neglected during the reign of Mary, Elizabeth invited German miners into the country, and great encouragement was given to mining operations in Cornwall, and various parts of England. The quantity of tin procured annually in the succeeding reigns of James I. and Charles, amounted to fifteen hundred tons. During, and for some time after the civil wars, the tin-trade declined, but revived again in the reign of George I., and has since been increasing. For an account of the annual products of the tin-mines of Cornwall and Devonshire, see the article Mines.

All the transactions connected with the tin-mines are under the control of the flanmary laws; courts are held every six months, and they decide by juries of six persons, with a progressive appeal to the lord warden and lords of the duke of Cornwall's council. By whatever method or accident a vein is discovered, permission of the proprietor must be obtained before any operations can be commenced, except in the case of such tin-mines as are anciently embounded according to the provision of the flanmary laws. (See Stannary Courts.) The owner of the foil is technically called the lord, whose share (which is called his dyke) is generally one-sixth or one-eighth of the ore. The duke of Cornwall receives a duty of four shillings per hundred weight of tin, which is taken when the tin is assayed and licensed; this process is called the coinage, from the French word coin, a corner. A corner is chopped off each block at the office, and if it be found sufficiently pure, the blocks are flemmed with the arms of the duke. The annual revenue of the tin is about 10,000l.; the average annual amount being about 3200 tons, and the value about 120l. per ton. The mode of assay is obviously rude and imperfect; and we have heard that foreigners have recently complained that the British tin was not so pure as that obtained from the Earl. But whatever be the purity of British tin, there can be no doubt that it is greatly adulterated on the continent. It is said that every tin-founder in Holland has English flumps, and be the quality of the tin what it may, the inscription makes it pass for English. The metal with which British tin is adulterated on the continent is lead, which being five times cheaper, and when mixed in small quantities not easily detected, the temptation for such fraud is great. It is not true, as alleged by some foreign writers of respectability, that British tin is purposely alloyed with certain portions of copper and lead before it is exported from Cornwall. The ore of tin, in the tin-mines of Cornwall, are so intimately associated with portions of copper-ore, lead-ore, arfennical pyrites, and other metals, of which a small mixture will remain in the block-tin, and can only be separated by subsequent refining, that any considerable portion of alloy may be detected by the increase of specific gravity. Grain-tin, which is the purest tin of commerce, is smelted from the finest ore by a charcoal fire; the common block-tin is smelted with pit-coal or culm, as before stated. Grain-tin is used for various purposes in the arts, where tin of the purest quality is required.

Long as the tin-mines of Cornwall have been worked, they still continue to supply in abundance this useful metal; but from the greater extent of the present works, and from the circumstance of tin always occupying the upper part of the vein, we may infer that the tin-mines of that county will be exhausted at no very distant period. At present, the principal part of the tin is obtained from the western extremity of the county; but when the tin-mines in that district are worked out, we may consider the tin-trade of Cornwall as nearly extinct. The granitic range of Dartmoor, in Devonshire, has been less explored than Cornwall; but there is reason to believe that the metallic repositories of tin and copper which it contains will furnish an ample field for the industry of future adventurers, and a failure in the supply from Cornwall would greatly enhance the price of this metal, and give increased spirit to mining speculations.

Tin, in Chemistry and the Arts. The colour of tin is white, like that of silver; it has a fusible tale, and when rubbed, emits a peculiar smell: its hardness is greater than that of lead, and less than that of zinc: its specific gravity is stated by Briffon to be 7.291, and it is said to become a little greater by hammering; it is very malleable, and may be beaten into very thin leaves. Tin-foil, as it is termed, is usually about 1/2500th of an inch in thickness; but this is by no means the utmost degree of thinness which it will bear. Its ductility and tenacity are rather low: a tin wire, 1/8th of an inch in diameter, is blunted by Mufflesbroek (as quoted by Dr. Thomson) to be capable of supporting a weight of 31 lbs. only, without breaking. Tin may be easily bent, and when bent, produces a peculiar cracking noise: it fuses at about 442° of Fahrenheit's scale, but will bear a most intense heat before it is volatilized. On being exposed to the atmosphere, its surface becomes slightly tarnished, but it undergoes no other change. When kept under cold water it undergoes no change; but red-hot tin, exposed to the vapour of water, decomposes it, an oxyd of tin is formed, and hydrogen gas is evolved. Exposed to the action of the air in a melted state, it quickly becomes covered with a greyish powder, or oxyd; and if the heat is very violent, it is flated to take fire, and to burn with a pale white light.

Tin unites with oxygen in two proportions, as has been lately proved by Gay Lussac, in opposition to Berzelius, who concluded from his experiments that there were three oxyds of tin. (See Annal. de Chimie et Phys. vol. i. p. 40.)

The first oxyd, or protoxyd, of tin, consists of about

\[
\text{Tin} \quad \text{Oxygen} \quad \text{100}.
\]

The second, or peroxyd, of about

\[
\text{Tin} \quad \text{Oxygen} \quad \text{27.2}
\]

This gives the weight of the atom 7.332. Dr. Thomson is inclined to consider it as 7.375; but it perhaps will be found hereafter either 7.25 or 7.5. The first of these oxyds may be formed by dissolving tin in muriatic acid, either by means of heat, or by adding occasionally a little nitric acid; when dissolved, it add to it a solution of potash; a white precipitate falls, which is partly taken up again; but the remainder, on standing, assumes a dark grey colour, and even a metallic lustre; and on being heated to whitening, is pure protoxyd of tin. The peroxyd may be formed by boiling
boiling the protoxyd in dilute nitric acid, drying by evaporation, and heating to reduce.

Tin forms likewise two combinations with chlorine. When tin is burnt in chlorine, a very volatile clear liquor is formed, a non-conductor of electricity, and which, when mixed with a little water, becomes a solid crystalline substance, a true muriate of tin, containing the peroxvd of tin. This compound has been called the *smoking liquor of Libavius*, from its discoverer, who formed it by distilling together amalgam of tin and corrosive sublimate. According to the experiments of Dr. John Davy, it consists of two atoms or proportions of chlorine united to one of tin; or of about

<table>
<thead>
<tr>
<th>Tin</th>
<th>Chlorine</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>121.82</td>
</tr>
</tbody>
</table>

*Prochloride of tin,* first described by Dr. J. Davy, is a grey, semi-transparent, crystalline solid, and may be formed by heating together amalgam of tin and calomel. According to the same chemist, it consists of one atom or proportion of chlorine united to one of tin; or of about

<table>
<thead>
<tr>
<th>Tin</th>
<th>Chlorine</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>60.72</td>
</tr>
</tbody>
</table>

Tin combines readily with sulphur and phosphorus, but not with hydrogen, azote, carbon, or boron.

There are two sulphures of tin; the first may be formed by fusing tin and sulphur together: it is of a blueish colour, and lamellated structure; and from the experiments of Dr. J. Davy, consists of one proportion of tin united to one of sulphur. The other sulphuret of tin is made by heating together the peroxvd of tin and sulphur. It is of a beautiful gold colour, and appears in fine flakes. It was formerly called *aurum mufiueum,* and various complicated processes given for forming it. Pelletier and Proust investigated its nature, and concluded it to be a compound of oxyd of tin and sulphur; but Dr. Davy has shown that this is not the case, and that it consists merely of one proportion of metallic tin united to one proportion of sulphur.

The phosphuret of tin may be formed by heating the two substances together. Only one phosphuret is known; it has a metallic appearance, and is so soft, that it may be cut with a knife. When gently heated in the air, the phosphorus takes fire. According to the experiments of Sir H. Davy, it contains about 17 per cent. of phosphorus, and consists therefore of one atom or proportion of phosphorus united to one of tin.

Tin combines with most of the metals, and some of its alloys are much employed.

Its alloys with the metals of the fixed alkalies speedily tarnish in the air, and effervesce in water.

It readily unites with gold by fusion, and was formerly supposed to have the property of rendering this metal brittle; but this has been more recently denied. An alloy of 11 gold and 1 of tin, was found by Mr. Hatchett to have a pale whitish colour, brittle when thick, but when cut thin, capable of being bent easily. Its fracture was fine-grained, and of an earthly appearance. Mr. Alchorne found, that gold alloyed with no more than 4% of tin, retains its ductility sufficiently to be rolled and flamed in the usual manner. But Mr. Tillet showed, that when heated to redness, the tin melts, and the alloy falls to pieces.

Its alloys with platina, according to Dr. Lewis, are brittle and dark-colored, when the two metals are in equal proportions. The alloys of tin and silver are very hard and brittle. The alloys, or rather amalgams, of tin and mercury differ in hardness, according to the proportions in which the two metals are mixed: three parts of mercury and one of tin form an amalgam which crystallizes in cubes, or, according to Sage, in the form of brilliant square plates, thin towards the edges. Tin readily combines with copper, and forms alloys exceedingly useful for a variety of purposes, as will be briefly noticed when we speak of the uses of this metal. Tin does not readily combine with iron, but their union may be effected by fusing them together in close vessels; it combines with zinc by fusion, and the alloy is harder than zinc, and stronger than tin: with lead it readily unites in all proportions, and the lead by the addition becomes considerably harder.

The oxyds of tin are capable of combining with the alkalies, and of forming with them peculiar compounds.

*Salts of Tin.*—Tin is oxydated and dissolved by many of the acids, and forms salts, differing in their nature according to the degree of oxydizement of the metal.

*Nitrates of Tin.*—Concentrated nitric acid (specific gravity 1.48) poured on tin, exerts but little action upon it; but if a little water be added, a violent action is exerted, and peroxvd of tin is formed, which separates in the form of a white powder, this oxyd being apparently incapable of combining with nitric acid: in this case, both the acid and the water are decomposed, and nitrate of ammonia is formed; but if the acid be diluted, and care be taken to moderate its action upon the metal, the water only is chiefly decomposed, and the protoxyd of tin is formed, which combining with the nitric acid, forms a solution of a yellow colour, which is a real nitrate of tin. Still, however, a little nitrate of ammonia is formed, and the nitrate of tin itself is not permanent, the metal continuing to pass to the flate of peroxvd, and gradually separating. The same change is produced by heating the solution, a precipitate being deposited, which, however, is partly subnitate of tin.

*Muriates of Tin.*—We have already spoken of the chlorides, or compounds of tin with chlorine. Now if water be added to these chlorides, they are converted into muriates of tin. The muriate of tin, in which the metal is in the flate of protoxyd, may be formed, however, by dissolving tin in about four times its weight of muriatic acid: hydrogen escapes, and the solution has a brownish-yellow colour, and yields, on evaporation, small needle-shaped crystals, soluble in water, and somewhat deliquecent. Water poured upon it in small quantity decomposes it, and converts it into a submuriate, which is precipitated, and a super-muriate, which remains in solution. A similar effect is produced by the alkalies, when not added in excess. This muriate of tin, formed of the protoxyd, has a great tendency to combine with oxygen, and to pass into the flate of muriates with the peroxvd, and this property enables it to exert many curious effects upon other metallic salts. Thus, for example, the red oxyd of mercury, the black oxyd of manganese, the white oxyd of antimony, the oxys of zinc and silver, are deprived of their oxygen by this salt, and reduced to the metallic flate. The muriate of tin with the peroxvd of the metal may be formed as before mentioned. It is capable of crystallizing, and possesses properties quite different from those of the muriate above described. It is much used by dyers, who generally form it by dissolving tin in nitro-muriatic acid.

*Sulphate of Tin.*—Sulphuric acid, when cold, has little action on tin, but assifled by a moderate heat, it attracts oxygen from it; sulphurous acid gas is evolved, and a sulphate of tin is formed, which yields, when evaporated, small needle-formed crystals. It is probable there are two sulphates
TIN.

It was formerly recommended for its antihelminthic virtues; but it is possible, says Dr. Lewis, that these may proceed not so much from the pure metal, as from a certain substan-
tance of a different or arsenical nature, of which the purest
fors of tin are found to participate.

The principal preparations of tin are as follow:

Tin, Butter of, is a name given by some chemists to a
combination of tin with the concentrated marine acid of cor-
rive sublimate. It is procured by reducing these sub-
stances into small parts, and mixing them together: this
mixture will, by degrees, be moistened by the hu-
midity of the air. The decomposition of the corruive
sublimate by the tin is more speedily effected by distillation.

Tin, Calx of, is the metal reduced into powder, either
by means of fire, or by being diffused in an acid menstruum,
and precipitated with an alkali.

Tin, Ceruif of. See Spanifh White.

Tin, Diaphoretic of. See Antihelminthic Pomeri.

Tin, Flowers of, are a kind of white coferetic, or paint
for the complexion, drawn from tin with fal ammoniac, by
means of sublimation.

Tin, Gold-coloured preparation of, is made by adding fix
ounces of mercury to twelve of melted tin, pulverizing the
cold mafs, mixing with it seven ounces of flowers of sulphur
and fix of fal ammoniac, and subliming in a mafrafs.

This preparation is called aurum mosiicum, and as a medi-
cine is little regarded, though formerly much esteemed
against hysterical and hypochondriacal complaints, malignant
fevers, and venereal disorders. Upon experiment, it appears
to be little more than calx of tin.

Tin, Salt of, Sal Jovis, is prepared from twelve ounces
of calx of tin, and four of aqua regia, diluted with twenty-four
of water; after digestion for two days, the veffel is to be
shaken, the more ponderous part of the calx suffered to set-
tle, the turbid liquor poured off, and evaporated almoft to
dryness, and the mafs further exacated on brown paper;
to the remaining calx half the quantity of fresh menstruum
is to be added, and the procesg repeated. Dr. Lewis's ex-
perience has not enabled him to pronounce on the virtues of
this falt, which is in talle very sharp and corruive: he thinks
it needful to calcine the metal, as tin uncalcin'd diffolves
much more eafily and plentifully, and the solution is in both
cafes the fame. According to Hoffmann, the solution of tin
is a strong purgative. Lewis's Mat. Med.

Tin: is also a word used by some of the chemical writers
to express fulphur.

Tin-Coping, in Rural Economy, a fort of covering of this
kind of metallic subfance in the flace form, which is not un-
commonly employed on the upper parts of the frames,
flats, or fladdles of corn-flacks, for the purpose of pre-
venting defruutive vermin from entering or getting into
them. It is a cheap, ready, convenient, and useful mate-
rial in this intention, in many cafes, which the arable farmer
should not be inattentive to in his flack-yard.

Tin-Floors, a contrivance used by our husbandmen who
propagate hops, to dry them after the gathering. See Oost.

It is thus done: Let a square brick room be built, with
a door on one side, and a long fire-place of a foot wide in the
middle, reaching almost across it; let holes be made at the
sides of this fire-place, to let out the heat into the room;
and at the height of five feet above this, let a door be made
of laths of an inch thick, laid lattice-wise. Let this be
covered with great plates of double tin, taking care that the
joinings of the tin be well foldered, and lie upon the laths,
now over the interlacies, which may be about four inches
wide. Let a row of boards be fitted round the edge of

Vol. XXXV.
TIN

this floor, to keep the hops from falling off; then lay on a covering of hops of a foot thick, and make a small fire of charcoal in the mouth of the fire-place, and the hops will dry very quickly and very regularly. They may be continually stirred about while drying, and, when dry, a part of the bearded edge of the kiln may be taken down, and the dried parcel thrust out, and a fresh parcel laid on in its place. A very small quantity of fuel is sufficient in this way, and any fuel will do, for the smoke never comes at the hops. There is a very great improvement fill upon this method of drying hops, used by some people: this is the making of a wooden cover, of the size of the tin-floor; this is covered with plates of tin nailed on, and is suspended over the kiln in such a manner, that it may be let down at pleasure, when the lower parts of the hops are dry. This is to be let down within ten inches of their surface, and there it acts as a reverberatory, and drives back the heat on the upper ones, so that they are dried as soon as the lower ones. Thus all the trouble of turning is saved, and the hops are much better dried than in any other way. Mortimer's Husbandry, p. 186. See VENTILATOR.

Tin-Feil. See FOIL, FOLLATING, and LOOKING-Glass.

Tin-Hatch, in Mining, a term used by the people of Cornwall, to express the opening into a tin-mine. They also call it tin-shaft.

They make several openings in the sides of the hills where they expect veins of ore to be. All these, except that which opens on the head of the mine, are called effay-hatches; but that which does fo, is made their entrance afterwards, and changes its name to that of the tin-hatch. See HATCHES and SHAFT.

Tin-Hoop for Cheefs, in Rural Economy, a light thin hoop constructed of this fort of sheet metallic fulbance, that is sometimes employed in cheese-making, for holding and keeping the curd together while it is breaking and being crumbled down into the filling-vat, in order to prevent the trouble of raising and holding up the corners of the cloth which is made use of in the bulling. It is usually about nine inches in breadth, and formed so as exactly to fit the top part of the cheese-vat on which it rests when used. These hoops are sometimes made of other materials, as wood, &c. and are useful in saving time and trouble.

Tin-Oré, called tin-fluff by the miners in Cornwall. See TIN-STONE.

M. Gellert directs, that ores of tin should be assayed in the following manner: Mix a quintal of tin-ore, washed, pulverized, and twice roasted, with half a quintal of calcined borax, and half a quintal of pulverized pitch; these are to be put into a crucible, moistened with charcoal-dust and water, and the crucible placed in an air-furnace: after the pitch is burnt, give a violent fire during a quarter of an hour, and then withdraw the crucible. If the ore be not very well washed from the earthy matter, as it ought to be, a larger quantity of borax is requisite, with some powdered glafs, by which the too quick fusion of the borax is retarded, and the precipitation of the earthy matter is prevented. If the ore contains iron, to the above mixture may be added some alkaline salt. See MOOR-STONE.

The method of assaying tin-ore, says Mr. Pryce, is very easy; for in its form and size of black tin (which is the ore dried by flamping, several washings, and calcination, if mineralized with vitriolic, arsenical, or sulphureous pyrites) great part of the work is done, and little more remains than fusion, which is accomplished by a red heat in the following process: Take four or five ounces of black tin as emptied from the facks, mix it well with about one-fifth part of its weight of powdered culm; put the mixture in a black-lead crucible, on the wind furnace, and, in about twenty minutes, the metal will be found precipitated to the bottom of the crucible, the culm and scoria floating on the tin. On the surface of this matter there will be globules of tin; and therefore the mixture should be stirred with an iron rod, to make them fall into the tin at the bottom. Close the furnace, and let the whole remain in fusion from three to five minutes. Keep in readiness an iron or brass mortar, and an ingot-mould about six inches long; pour the tin into the ingot, and empty the culm and scoria into the mortar, separating what remains in and about the crucible with a sharp iron. As soon as cold, put them into another mortar, and pulverize them gently, fo as to separate the scoria from the largest of the globules of tin. Select the larger globules, and pulverize the remainder a second time; then put this stuff, twice powdered, on a shovell, and paffing it often through water, in the same manner as the lighter parts are washed from ores in vaning, and the smaller globules will remain on the shovell; and thefe, with the larger (both together being generally called pillon-tin), being added to, and weighed with the ingot, dew the produce in metal of the four or five ounces assayed. See Macquer's Chem. Dict.; and Pryce's Min. Corn. p. 269.

Tin-Plates, an article of manufacture very common among us, and vulgarly called tin. It is iron plated over with tin. The French call it fer blanc, white iron, as we sometimes do in England. It was once known under a distinct name, lattin, under which article the proceeds of manufacturing it is described.

The procws used for this purpose near Caermarthen, in South Wales, which is described by Mr. Donovan, in his "Descriptive Excursions through South Wales in 1805," is as follows:

The iron-ore employed in this manufactury is the common kind of the country, intermixed with a large portion of the fine haematite from Ulverstone, in Lancashire, which gives a very fine metal. This too is melted with charcoal instead of coke, to produce a metal of the greatest purity and extensibility, and chofens of texture, which qualities are particularly required in this manufactury. The reduced ore is melted in the usual manner, and cast into pigs, which are then wrought by the hammer into long flat bars, that are afterwards cut into pieces of about ten inches in length. These are then wrought into plates by being heated red-hot, and passed through a flattening-mill, which consists of two large cylinders of steel, cafe-hardened and secured in a frame of iron. These are placed contiguous to each other, but with a certain interval of space, and revolve in a contrary direction, fo that when one end of the bar is thult in the space between the cylinders, the whole is drawn through and proportionally extended and flattened in the paffage. The distance between the cylinders, which of course determines the thickness of the plate, is maintained and regulated by screws which can be altered at pleasure. When the bar is thus made into a plate of twice the thickness of the ordinary plates, it is heated red-hot, cut in two by a pair of shears, and one piece folded exactly over the other, and both repassd repeatedly through the cylinders till the folded plate has extended to the same length and breadth as the plate was before cutting. It is then clipped round the edges, and the two plates torn afunder (which requires some little force) after which they are each finished by passing through a finer rolling-prea, fo as to take away every creafe or inequality in the plate, and those that are too rough to pass through this finer prea are thrown aside.

The plates are then steeped in a very weak acid liquor, and when taken out are scourcd thoroughly with bra, fo as
to be quite bright and polished to enable the tin to adhere. The tin is melted in deep rectangular crucibles, and kept fluid by a moderate charcoal fire beneath. To prevent its calcination, a quantity of grease prepared from linseed-oil and fish is constantly kept floating on the surface of the tin, and renewed as it evaporates off, which gives an excellingly nafcent fench. The plate is then taken up by one corner by a pair of pincers, and dipped vertically into the tin, and when withdrawn is found beautifully white and re- splendent with the coating of this metal that adheres to it. This dipping is repeated three times for what is called single tin-plate, and fix times for the double plate. The plates are then only cleansed and sanded, and are fit for use.

We shall here add, with regard to the history of this manufacture, that in the year 1681, tin-plates were made in England by one Andrew Yarranton, who was sent to Bohemia to learn the manner of making them. But the manufacture was discontinued by his employers, and afterwards so much disregarded, as to be reckoned among the projects called bubbles of the year 1720; however, it was revived, and brought to such perfection about the year 1740, that very little of it was imported from foreign parts; our own plates being of a finer gloo, or coat, than that made beyond sea, the latter being hampered, and ours being drawn under a rolling-mill. And. Hilt. Com. vol. ii. p. 175, 361.

The two principal wholesale houses for this manufacture in London, are those of Jones and Taylor in Tottenham-court Road, and Howard and Co., in Old-street Road.

TINA, a name given by the old medical writers to a bath made of a strong decoction of many carminative ingredients to be used in the colic.

TINA, in Geography. See KNIN.

TINAGOB, a town on the W. coast of the island of Samar. N. lat. 12° 5'. E. long. 124° 50'.

TINALMO, a town on the S. coast of the island of Lucon. N. lat. 15° 38'. E. long. 122° 42'.

TINAMASAKI, a town of Japan, on the S. coast of the island of Niphon. N. lat. 34° 12'. E. long. 136° 57'.

TINAPA, a town of Mexico, in the province of New Biscay; 120 miles N.W. of Duranga.

TINARA, a town of Nubia, on the Nile; 200 miles S.S.W. of Syene.

TINCA, the Tinch, in Ichthyology. See CYPRINUS TINCA, and TENCH.

TINCA MARINA, the fast-trench, a name given by some authors to the common turdus, called in English the eelrasp, and physis.

TINCAL, is a name given to borax in the crude state in which it is brought from India, and before it is refined. It consists of small crytals of a yellowish colour, and it has a greasy or unctuous touch. See BORAX.

According to M. Cadet, it contains a larger quantity of the peculiar vitreous earth of borax than the refined salt commonly sold does. See BORAX.

TINCAUSARIS, in Ancient Geography, a place of Africa, in Cyrenaica, on the route from Carthage to Alexandria, between Boreum and Attica. Anton. Itin.

TINCHEBRAY, in Geography, a town of France, in the department of the Orne; 10 miles N. of Domfront.

TINCO, a town of Spain, in the province of Afturias; 20 miles N.W. of Oviedo.

TINCONTUM, or TINCNCOUM, in Ancient Geography, a town of Lyonnese Gaul, between Avarican and Decidua. Anton. Itin.

TINCTOR, John, in Biography, born at Nivelle, in Brabant, and flourished about the year 1474. He was a great musician, long in the service of Ferdinand of Aragon, king of Naples and Sicily, who reigned from 1458 to 1516, and styles himself his arch-deacon, chaplain, and cantor. Besides several musical tracts by this early writer on counterpoint, he was author of the first musical dictionary. All written music in counterpoint during the fifteenth century was composed for voices, at least we have never seen any other; and being intended for the church, was set to Latin words: so that the first terms used in the art, were likewise in that language; and these were so numerous in Tinctor's time, that he collected them, under the title of "Terminorum Muficii Difinitorium," and printed them at Naples. This was doubtless not only the first musical dictionary that was ever compiled, but the first book that was printed on the subject of music in general. The work is so rare, that we have never been able to find it, except in his majesty's inelimanible library. In this "Difinitorium," we first met with the precise definition of the four principal parts in vocal counterpoint: <em>canus</em>, <em>altus</em>, <em>tenor</em>, and <em>basse</em>; which fee under their several heads.

Tinctor, in one of his tracts, gives to the English the invention of counterpoint. See DUNSTABLE.

Walther seems never to have heard of Tinctor's "Difinitorium;" yet he gives the title of his three tracts: "De Arte Contra puncti," "De Tonis," and "De Origine Musicæ," from Gfner's Bibl. Univ.

TINCTORUM RUBIA. See MADDER.

TINCTURE, TINCURA, in Pharmacy and Chemistry, a separation of the finer and more volatile parts of a mixed body, made by means of a proper menstruum dissolving the same.

Tincture is more particularly used for an extract of part of the substance of a body, especially its flavour and colour, which are thereby communicated to the menstruum.

Tinctures, in the Materia Medica, are spirituous solutions of such of the proximate principles of vegetables and animals, as are soluble in pure alcohol or in proof-spirit; and they are said to have been invented about the end of the thirteenth century, by a professor of medicine at Montpelier, called Arnold de Villa Nova. From vegetable matter submitted to its action, alcohol takes up fugar, resin, extractive, tannin, cinchonin, camphor, volatile oils, several acids, and the narcotic principle; proof-spirit also takes up the whole of these partially, and is beside the proper menstruum for gum-resins; so that alcohol, either in a concentrated or diluted form, is capable of separating the greater part of the active principles of vegetables from the ligneous inert fibres. The tinctures obtained from animal substances are very few in number, and the principles taken up by the spirit are analogous to those enumerated above, belonging to the vegetable kingdom.

Pure alcohol is required in very few infusions only for the formation of tinctures, proof-spirit being adequate for almost every purpose. The dilution of the spirit, however, must be varied according to the known principles of the infusions to be submitted to its action: when resin predominates, it must necessarily be more concentrated; when gum-resin or extractive is the most abundant constituent, proof-spirit then must be employed. In consequence of the great affinity of water for alcohol, the addition of it to alcoholic tinctures separates the resin, camphor, and volatile oils they contain; but water is generally miscible with tinctures made with proof-spirit, without producing any decomposition. Tinctures are not liable to fuller spontaneous decomposition, as is the case with infusions and decoctions; and, independently of the lofs which takes place from the evaporation of the spirit and the volatile oils, if the bottles containing tinctures be closely corked, they may be
be kept for an indefinite length of time, and their virtues remain unimpaired.

Tinctures are prepared by macerating the ingredients in the spirit in a temperature not exceeding 80°, at which degree, by allowing the menstruum to remain on the ingredients for a sufficient length of time, all the principles that can prove useful in the tincture are extracted, and the solvent saturated. The ingredients must be dried and reduced to a coarse powder, and the maceration made in close vessels, and assisted by frequent agitation. When completely made, tinctures should not be allowed to remain upon the ingredients, but be filtered through bulblous paper, and kept in this state in well-corked bottles.

The chief use of this class of preparations is to cause infusions and decoctions to which they are added, to fit lighter upon the stomach, or to unite with them some active principle, which the water is incapable of extracting; Thomson's London Dispensatory.

A great variety of tinctures may be given to common water, and many remarkable things occur in their changes on the addition of common menstrua. Take a large spoonful of the syrup of pomegranate-flowers, mix it with five spoonfuls of water; the mixture will be of a very lively and brilliant red: for a violet colour, take the same quantity of syrup of violets and the same of water. When these tinctures are thus prepared, have at hand a phial, in which is a small portion of oil of tartar, which will only look like water remaining after the washing of the phial. Pour the red or the violet tincture into this phial, and it immediately becomes a fine graft-green. Dissolve in a quantity of a walnut of crude salt ammoniac in a glass of water, pour all out except three or four drops at the bottom, and pour into this glass the fine red liquor, and it immediately becomes black as ink. In order to change the purple liquor red, only have a small quantity of spirit of vitriol in the bottom of a phial, and pour into this the violet water; it immediately on this becomes of a florid red.

Steep Brandi wood in common water, or in white wine, twenty hours; the liquor will then look of the colour of red wine: pour this into a glass washed with vinegar, and it becomes of a fine yellow, like fack. If this experiment be made with white wine, the wood and the vinegar make so little alteration in it, that it may be drank afterwards, and the whole process seems a way of turning red port into fack. Into this liquor, when yellow, put a few drops of a tincture of benjamin made in spirit of wine, and it immediately loses its yellow colour and becomes white. Beat some galls to fine powder, and rub the powder on a towel; then put into a bacon of water, in which any person is going to wash their hands and face, a small piece of common green vitriol, or copperas: after the person has washed, let them have this towel to wipe on, and the hands and face will be as black as if washed with the common writing-ink; the copperas in the water and the galls on the towel making real ink where they mix. This does no lauirng injury to the skin, but will come off again upon washing with soap. Phil. Trans. N° 238, p. 88.

We shall here enumerate and describe the principal tinctures that occur in the materia medica.

**Tincture of Acetate of Iron** is prepared, according to the Dub. Phar. by adding together two ounces of acetate of kali and one ounce of sulphate of iron in a rongeware mortar, till they unite in a soft mass, and when dried by a moderate heat, triturating it with two pints of rectified spirit of wine; and then digesting it for seven days in a phial, closely corked, and frequently agitated, and then pouring the clear tincture from the face.

**Tincture of Acetate of Iron with Alcohol**, is prepared by rubbing together sulphate of iron and acetate of alkali, of each an ounce, and proceeding as in the former article, triturating with two pints of alcohol; and digesting for twenty-four hours. These tinctures have a peculiar odour, a reddish-brown colour, and a warm acid taste; and poffefs the fame medical properties as the other preparations of iron. The dose of either may be from 1/1 x to 3/4j., given in water or any other suitable vehicle.

**Tincture of Acetate of Zinc of the Dub. Ph.,** is obtained by rubbing sulphate of zinc and acetate of kali, of each an ounce, and adding one pint of rectified spirit of wine, and then macerating for a week with occasional agitation, and filtering through paper. This tincture is astringent, but requires to be diluted with water, before it is used either as a collyrium or an injection. It may be beneficially employed as an internal remedy in dysepsia and other debilities of the stomach.

**Tincture of Aloes of the Lond. Ph.,** is prepared by macerating of extract of spikèd aloes powdered, half an ounce; of extract of liquorice, an ounce and a half; of water, a pint; and of rectified spirit, four fluid-ounces, in a fand-bath until the extract is dissolved, and then draining.

The tincture of aloes of the Dub. Ph. is obtained by digesting for seven days, half an ounce of focotarine aloes powdered, an ounce and a half of extract of liquorice dissolved in eight ounces of boiling water, and eight fluid-ounces of proof-spirit, and then draining.

The tincture of focotarine aloes of the Edinb. Ph. is formed by digesting for seven days, with a gentle heat, in a close vessel, often shaken, half an ounce of focotarine aloes in powder, an ounce and a half of extract of liquorice, four ounces of alcohol, and a pound of water; and pouring off the clear tincture. Its dose is from 1/1 x to 3/4j.

**Tincture, ethereal, of aloes of the Edinb. Ph.,** is prepared by digesting an ounce and a half of myrrh with a pound of sulphuric ether with alcohol, for four days, in a cloked bottle, and then adding one ounce of English saffron cut, and one and a half of focotarine aloes in powder; digesting again for four days, and pouring off the tincture. This is a warm stomachic purgative, and is given with advantage in dysepsia affections, jaundice, gout, chlorosis, and other cases in which aloetics are proper; in doses of 1/1 x or 3/4j as a stomachic, and in larger doses as a brisk purge.

**Tincture, compound, of aloes of the Lond. and Dub. Ph.,** is prepared by macerating for fourteen days (seven days Dub.), of extract of spikèd aloes powdered, and saffron, of each three ounces, in two pints of tincture of myrrh; and draining.

**Tincture of aloes and myrrh of the Edinb. Ph.,** is prepared by mixing a pound and a half of alcohol with half a pound of water, and then adding two ounces of myrrh in powder; digesting for four days; and, lastly, adding of focotarine aloes in powder an ounce and a half, and an ounce of English saffron cut; digesting again for three days, and pouring off the clear tincture. This tincture may be administered in the same cases and doses as the former; and it is occasionally used as a local stimulant to foul ulcers.

The tincture of aloes, formerly called tinctura srica, and hiera pica, was ordered to be made by digisting five ounces of the powder, called hiera pica, or a powder formed of eight parts of aloes and two of canella alba, in five pints of mountain wine; or an ounce of aloes, with one drachm of the leffer cardamom seeds, and the same quantity of ginger, in two pouds of the same wine. Lewis.

Dr. Buchanan directs this tincture to be made by infusing an ounce of focotarine aloes in powder, and two drachms of Virginia flake-root, and as much ginger, in a pint of mountain
TINCTURE.

mountain wine and half a pint of brandy, for a week, frequently shaking the bottle, and strainning off the tincture. This, he says, is a safe and useful purge for persons of a languid and phlegmatic habit; but it is thought to have better effect when taken in small doses as a laxative. The dose, as a purge, is from one to two ounces.

Tincture of Ambergris. See Ambergris.


Tincture of Angustura Bark. See Angustura.

Tincture of Antimony used to be thus made: Take half of tartar, a pound; antimony, half a pound; rectified spirit of wine, a quart; reduce the antimony to powder, and mix it with the half by fusion over a strong fire. When it is cold powder it, and pour on the spirit of wine; digest them together in a sand-heat, and then filter off the clear tincture for use. The half of tartar yields a tincture as well as antimony. It is a diaphoretic and attendant. See Antimony.

This tincture, on an empty stomach, is said to have sometimes proved emetic.

Tincture Anisophyllosis. See Tinctura Saturnina.

Tincture Aromatic, may be prepared by infusing two ounces of Jamaica pepper in two pints of brandy, without heat, for a few days, and then straining off the tincture. This will answer all the intentions of the more costly preparations of this kind.

Tincture of Assafetida. See Assafetida.

Tinctura Auranti, Tincture of Orange-peel, is obtained in the Lond. and Dub. Ph., by macerating three ounces of fresh orange-peel in two pints of proof-spirit for fourteen days (three days Dub.), and filtering. This is an useful adjunct to infusions and decoctions in dyspepsia, communicating to them an agreeable flavour, and not decomposable by water.

Tincture of Bark. See Anoustrera and Tincture of Cinchona.

Tincture of Benzoin, Compound, of the Lond. and Dub. Ph., is prepared by macerating for fourteen days (seven days Dub.), three ounces of benzoin, two ounces of flower balfam strained, one ounce of balfam of Tolu, and half an ounce of spiced aloes, in two pints of rectified spirit, and filtering.

The compound tincture of benzoin of the Edinb. Ph., or Traumatic balfam, is obtained by digging for seven days, three ounces of benzoin in powder, two ounces of balfam of Peru, half an ounce of hepatic aloe in powder, in two pints of alcohol, and filtering through paper. This tincture is a stimulating expectorant, and sometimes prescribed in chronic catarrh and old athmatical cæs; but chiefly used as an external application to wounds and languid ulcers. Its dose is from 1/3 ij to 1/5 j, or more. See Benzoin.

Tincture of Calumba of the Lond. Ph., is had by macerating for fourteen days of calumba (or Columbia) root sliced, two ounces and a half, in two pints of proof-spirit, and filtering.

The Edinb. tincture of calumba is obtained by digging for seven days, two ounces of calumba root in powder, in two pounds of proof-spirit, and filtering through paper. This is an useful addition to inflamatic infusions and decoctions. See Columbia.

Tincture of Camphor, Compound, is ordered by the Lond. Ph. to be prepared by macerating for fourteen days, of camphor two scruples, of hard opium powdered and acid of benzoin, of each one drachm, in two pints of proof-spirit, and filtering.

The camphorated tincture of opium, or "paregoric elixir," is obtained by digging for ten days, of hard purified opium in powder, and benzoic acid, of each a drachm, of camphor two scruples, of essential oil of aniseed a drachm, in two pints of proof-spirit, and filtering. This is an useful anodyne in chronic asthma, hooping-cough, and catarrh after the inflammatory symptoms have abated, and contributes to allay the frequent cough. The dose is from 1/3 j to 1/5 j occasionally, using after it the inhaler, and 1/5 j in cases where quiet, rather than sleep, is required. See Camphor.

Tincture of Capsicum of the Lond. Ph., is obtained by macerating for fourteen days, an ounce of capsicum berries in two pints of proof-spirit, and filtering. The dose is from 1/3 j to 1/5 j occasionally, using after it the inhaler, and 1/5 j in cases where quiet, rather than sleep, is required. See Capsicum.

Tincture of Cardamom of the Lond. and Dub. Ph., is prepared by macerating for fourteen days (seven days Dub.) three ounces of cardamom seeds husked and bruised, in two pints of proof-spirit, and filtering.

The tincture of cardamom, or "tinctura amomi repentina," of the Edinb. Ph. is had by digging for seven days, four ounces of lesser cardamom seeds bruised, in two pounds and a half of proof-spirit, and filtering through paper.

The compound tincture of cardamom of the Lond. and Dub. Ph. is prepared by macerating for fourteen days, cardamom seeds (husked Dub.) castor oil, and ethereal oil, of each, in powder, two drachms, cinnamon bark bruised half an ounce, molasses four ounces, in two pints of proof-spirit, and filtering. These are agreeable additions to inflamatic infusions.

Tincture of Cassia. See Cascara.

Tincture of Caffeina. See Caffeina.

Tincture of Caffier of the Lond. and Dub. Ph., is formed by macerating for seven days, of caffer powder two ounces, in two pints of rectified spirit (proof-spirit Dub.) and filtering. The Edinb. Ph. directs an ounce and a half of Russian caffer powder to be macerated for seven days in one pound of alcohol, and then filtered. The dose is from 1/3 j to 1/5 j. See Caffer.

The compound tincture of caffer of the Edinb. Ph. is obtained by digging for seven days, one ounce of Russian caffer powder, half an ounce of alfafaetida, in a pound of ammoniated alcohol, and filtering through paper. This is advantageously given in hysteria, cramp of the stomach, and flatulent colic, to the extent of 1/5 j for a dose.

Tincture of Catechu of the Lond. and Dub. Ph., is prepared by macerating for fourteen (seven Dub.) days, three ounces of extract of catechu, and two ounces of cinnamon bark bruised, in two pints of proof-spirit, and filtering.

The tincture of catechu, formerly Japanese tincture of Edinb. Ph., is prepared by digging for seven days, three ounces of extract of catechu in powder, two ounces of cinnamon bark bruised, in two pounds and a half of proof-spirit, and filtering through paper. This tincture is a folution of tannin, extractive matter, and the oil of cinnamon. The dose, in cases where astringents are required, is from 1/5 j to 1/5 j, taken in water or wine, or cretaceous mixture.

Tincture of Cinchona of the Lond. Ph., is obtained by macerating for fourteen days, seven ounces of lance-leaved cinchona bark in powder, in two pints of proof-spirit, and filtering.

The tincture of cinchona of the Edinb. and Dub. Ph. is had by digging for seven days, four ounces of cinchona bark in powder, in two pounds and a half (two pints Dub.) of proof-spirit, and filtering through paper. The dose is from 1/3 j to 1/5 j.

For the compound tincture of cinchona, see Snake-root.

This is the name as the celebrated tincture of Huxham, who
TINCTURE.

who gave it in intermittents and low nervous fevers, in diluted wine or other proper vehicle, with 10 or 15 drops of
elixir of vitriol (aromatic sulphuric acid, Edinb.) in doses of
from f$\frac{1}{2}$j to f$\frac{3}{4}$ij, or more in intermittents. See CINCHONA.

TINCTURE of Cinnamon of the Lond. and Dub. Ph., is
obtained by macerating for fourteen days (seven days Dub.)
three ounces of cinnamon bark bruised (three ounces and a
half Dub.) in two pints of proof-spirit, and filtering. The
dose, as a fit adjunct to the chalk mixture and astringent
infusions, is from f$\frac{1}{2}$j to f$\frac{3}{4}$ij.

The compound tincture of cinnamon of the Lond. and Dub.
Ph., is prepared by macerating for seven days (seven days Dub.)
six drachms of cinnamon bark bruised, three drachms of
cardamom seeds bruised, long-pepper powdered and
ginger, of each two drachms, in two pints of proof-
spirit, and filtering. The

The compound tincture of cinnamon of Edinb. is formed by
digelling for seven days, cinnamon bark bruised, lefter

cardamom seeds bruised, of each one ounce, long-pepper in
powder two drachms, in two pounds and a half of proof-
spirit, and filtering through paper. This is benefically
used in flatulencies, atomic gout, languors, and debility, in
doses of f$\frac{3}{4}$ij or f$\frac{1}{2}$j properly diluted.

TINCTURA Crocei, or Tincture of Saffron of the Edinb. and
Dub. Ph., is prepared by digelling for seven days, one
ounce of English saffron cut in shreds in fifteen ounces (a
pint Dub.) of proof-spirit, and filtering through paper. See
CROCUS and SAFFRON.

TINCTURE of Fox-glove (Digitalis) of the Lond. Ph., is
obtained by macerating of fox-glove leaves dried (rejecting
the large ones) and reduced to a coarse powder, two
ounces, in a pint of proof-spirit, and filtering. The Dub.
Ph. directs two ounces of fox-glove leaves (the larger ones
rejected) dried and coarsely powdered, in a pint of proof-
spirit, and then to filter.

The tincture of fox-glove of Edinb. Ph. is had by digelling
for seven days, one ounce of fox-glove leaves dried, in eight
ounces of proof-spirit, and filtering through paper. The
dose of this tincture should be m$\frac{3}{2}$ at first, and gradually
increased.

TINCTURE of Galbanum of the Dub. Ph., is formed by
digelling for seven days, two ounces of galbanum cut into
small pieces, in two pints of proof-spirit, and then filtering.
Used as tincture of aalstexta, but less nauseous and less
powerful.

TINCTURE of Gall (Dub.) is prepared by macerating for
seven days, four ounces of gall in powder, in two pints of
proof-spirit, and then filtering. The dose, as an astringent,
is from f$\frac{1}{2}$j to f$\frac{3}{4}$ij.

TINCTURE of Gentian, Compound, (Lond. and Dub.) is
obtained by macerating for fourteen days (seven days Dub.)
two ounces of gentian root cut, one ounce of orange-peel
dried, half an ounce of cardamom seeds bruised, in two
pints of proof-spirit, and filtering. The

The compound tincture of gentian, commonly called "flo-
manic tincture," of Edinb. Ph., is prepared by digelling
for seven days, two ounces of gentian root sliced and
bruised, one ounce of orange-peel dried and bruised, half
an ounce of canella alba bruised, half a drachm of cochi-
nical in powder, in two pints and a half of proof-spirit,
and filtering through paper. This is an elegant Ronmanic
bitter and cordial, but in dyspepsia the infusion is preferable.
See GENTIAN.

TINCTURE of Gold. See AURUM POTABILE, and Chemical
HISTORY of GOLD.

TINCTURE of Guaiac of the Lond. and Dub. Ph., is pre-
pared by macerating for fourteen days (seven days Dub.)
half a pound of guaiac powdered (four ounces Dub.), in
two pints of proof-spirit, and filtering.

The tincture of guaiac of the Edinb. Ph., is formed by di-
gelling for seven days, one pound of guaiac powdered, in
two pounds and a half of alcohol, and filtering through paper.
Administered in the form of a draught, it must be
triturated with yolk of egg or mucilage, that it may com-
bine with water. The dose is from f$\frac{3}{4}$j to f$\frac{3}{4}$ij, in any con-
venient vehicle.

The ammoniated tincture of guaiacum of the Lond. and
Dub. Ph., is obtained by macerating for fourteen days (seven
days Edinb. and Dub.), four ounces of guaiac in powder,
in two pints of compound spirit of ammonia, and filtering.
The dose is from f$\frac{3}{4}$j to f$\frac{3}{4}$ij, triturated with any mucous or
vivid matter. See GUAIACUM.

TINCTURE of Black Hellebore of the Lond. Ph., is
obtained by macerating for fourteen days, four ounces of
the root of black hellebore sliced, in two pints of proof-spirit,
and filtering.

The tincture of black hellebore of the Edinb. and Dub. Ph.,
is prepared by digelling for seven days, four ounces of black
hellebore root bruised (powdered Dub.), half a drachm (two
brookles Dub.) of cochinical in powder, in two pounds and
a half (two pints Dub.) of proof-spirit, and filtering through paper. This tincture was regarded by Dr. Mead
as a powerful emmenagogue, and is still ordered in uterine
obstructions, and in some cutaneous affections. The dose
is from m$\frac{3}{4}$ij to f$\frac{3}{4}$ij, in any appropriate vehicle. See
HELLEBORE.

TINCTURE of White Hellebore. See TINCTURA VERATRI
Albi.

TINCTURE of Henbane of the Lond. Ph., is formed by
macerating for fourteen days, four ounces of the dried leaves
of henbane in two pints of proof-spirit, and filtering. The
Dub. Ph. directs to digell for seven days, two ounces and
a quarter of dried leaves of black henbane, in coarse powder,
in a pint of proof-spirit, and then straining.

The tincture of black henbane of the Edinb. Ph. is had by
digelling for seven days, one ounce of the dried leaves of
black henbane in eight ounces of proof-spirit, and filtering
through paper. In a dose of f$\frac{3}{4}$ij, it seldom fails of pro-
curing sleep and quiet, and does not affect the head or pro-
cude cooffiveness. In cafes of diarrhoea, a few drops of tinc-
ture of opium should be added to counteract its tendency
to pass off by the bowels.

TINCTURE of Hops of the Lond. Ph., is formed by ma-
cerating for fourteen days, five ounces of hops in two pints of
proof-spirit, and straining. This has been recommended
as a substitute for tincture of opium in gout and rheumatism.
The dose is from f$\frac{3}{4}$ij to f$\frac{3}{4}$ij, or more. See HOPS.

TINCTURE of Jalap of the Lond. Ph., is made by macer-
ating for fourteen days, two ounces of jalap root powdered,
in two pints of proof-spirit, and filtering. The Dub. Ph.
orders five ounces of jalap root in coarse powder, to be
digell for seven days in two pints of proof-spirit, and
then filtered.

The tincture of jalap of the Edinb. Ph. is formed by digell-
ing for seven days, three ounces of jalap root in powder, in
fifteen ounces of proof-spirit, and straining. See JALAP.

TINCTURE, Japanese. See TINCTURE of Catechu.

TINCTURE of Kino is obtained by macerating for four-
ten days, three ounces of kino in powder, in two pints of
proof-spirit, and filtering through paper. In the Edinb.
and Dub. Ph. two ounces of kino (three ounces Dub.) are
digell for two days in a pint and a half of proof-spirit,
and filtered through paper. The dose is from f$\frac{3}{4}$j to f$\frac{3}{4}$ij.

TINCTURE of Lacca. See LAC.
TINCTURE Lytta, or Tincture of Blistering Fly. See Lytta.

TINCTURA Martis cum Spiritu Salis, a medicine thus prepared: Take filings of iron, half a pound; Glæber's spirit of fixen, fift, three pounds; digest all together without heat, as long as the spirit will work upon the filings; then, after the faces have subided, pour off the clear liquor, evaporating it to one pound, and adding of rectified spirit of wine three pints.

Some combine the acid and inflammable spirits first, and digest three ounces of iron-filings in a quart of the dulcified compound. A few drops of this tincture are a sufficient dose. This tincture is good in all the cases in which the sal marris is fo.

TINCTURE of Martial Flowers. See Iron.

TINCTURE of Metals, called Lily of Paracelsus, may be prepared by melting together in a crucible two parts of metallic regulus of antimony, one part of fine tin, and one part of pure copper. The alloy thus compounded is to be powdered, when cold, and mixed with three of its weight of purified nitre. The mixture is to be thrown, at different times, into a red-hot crucible, where it detonates, and is exposed to a violent fire, till the metals be perfectly reduced to cakes. The matter is to be taken from the crucible, while red-hot, and immediately thrown into a heated iron mortar, where it is quickly powdered. The powder, while hot, is to be put into a matras, and upon it some rectified spirit of wine is to be poured to a height equal to the breadth of four fingers. The digestion is continued during some days, or till the spirit of wine has acquired a very deep yellowish-red colour. The spirit is to be decanted and kept in a bottle.

This tincture, although no part of the metals, reduced by calcination almost to the state of pure earths, can be dissolved by the spirit of urine, has a spirituous, faponaceous, acid, and alkaline character, and has been successfully used, when the fibres and vesicles require to be excited and animated, as in apoplexies, palpies, and dropsies. It is also capable of accelerating the motion of the blood, and of increasing certain secretions and excretions, particularly sweat and urine. The dose is from six or twelve drops to forty, or even more, and must be administered in some proper cordial. Macqueir's Dict. Chem.

TINCTURE of Marullae of Iron. See Iron.

TINCTURE of Myal of the Dub. Ph., is obtained by digesting for seven days, two drachmas of musk in powder, in a pint of rectified spirit, and then straining.

TINCTURE of Musk is directed, in the Edinb. Ph. of 1783, to be made by dissolving two drachmas of musk, in a pound of rectified spirit.

TINCTURE of Myrb of the Lond. Ph., is prepared by macerating for fourteen days, three ounces of myrrh bruised, in twenty-two fluid-ounces of rectified spirit, and a pint and a half of water, and filtering. The Edinb. Ph. directs three ounces of myrrh in powder to be digested for seven days, in twenty ounces of alcohol and ten ounces of water, and filtered through paper. The Dub. Ph. orders three ounces of myrrh bruised to be digested for seven days, in a pint and a half of proof-spirit and half a pint of rectified spirit, and then strained.

This tincture is tincce and deobdulent; it is used now generally in gargles, combined with infusions of roses and acids; or applied to foul ulcers and exfoliating bones, or diluted with water, as a wash for the mouth when the gums are spongy. The dose is from f3s to f3.

TINCTURE of Opium of the Lond. Ph., is formed by macerating for fourteen days, two ounces and a half of hard opium powdered, in two pints of proof-spirit, and straining.

The tincture of opium of Edinb. Ph. or Thebaic tincture, or liquid laudanum, is obtained by macerating for seven days, two ounces of opium in two pounds of proof-spirit, and filtering through paper.

TINCTURE of opium, or Thebaic tincture of Dub. Ph. is prepared by digesting for seven days, ten drachmas of purified hard opium in coarse powder, in a pint of proof-spirit, then straining. The usual dose is from 1/12 to 1/2x. In colica pictonum, f3j, given before purges, facilitates their action, and renders the relief more speedy; and in tetanus, f3ys have been advantageously given in divided doses, in twenty-six hours. The tincture externally applied allays local pain, and afflicts in relaxing the fpasm in lock-jaw and similar affections.

The ammoniated tincture of opium of the Edinb. Ph. is formed by digesting for seven days, in a clove phial, three drachmas of benzoic acid, and the same quantity of English saffron, cut in threads, two drachmas of opium, half a drachm of volatile oil of aniseed, in sixteen ounces of ammoniated alcohol, and filtering through paper. This tincture is used in hooping-coughs and phthisic althaea. Each f3j contains gr. j. of opium. See Opium.

TINCTURE of Quaffia of the Dub. Ph., is obtained by digesting for seven days, an ounce of chips of quaffia wood in two pints of proof-spirit.

TINCTURE of Rhubarb. See Rhubarb.

TINCTURE of Saffron. See Tinctura Croci.

TINCTURE of Sena. See Sena.

TINCTURE of Salt of Tartar, is made by pouring some rectified spirits of wine, to a height equal to the breadth of three or four fingers, into a heated matras, that contains some hot falt of tartar, which has been previously fused in a crucible and powdered. The matras is to be closed, and the digestion continued for several days with a gentle heat, or till the spirit of wine has acquired a fine reddish-yellow colour.

This is essentially the same as tincture of metals, their medicinal qualities being the same.

TINCTURA Saturnina, the lead tincture, a name given in the late London Diffenatary to the tincture before called tinctura antiphlogistica, because it was used to check the immoderate sweats in hectic complaints.

This is made of fugar of lead and green vitriol, of each two ounces, and of rectified spirit a quart. The fals are separately to be reduced to powder, and then put into the spirit, then the whole is to stand some days without heat to extract the tincture, and afterwards filtered through paper.

Many persons have found great perplexity in making this tincture, it having at first began to shew a good colour, but afterwards loll: this accident is owing to the heat usually employed in making the tincture.

This tincture is a powerful lytic, and is often used with good success in hectic fevers, spitting of blood, heat of the kidneys, simple gonorrhæas, flux albus, and tabes dorsalis.

It was first recommended by Etmuller; who, from its effect, gave it the name of tinctura antiphlogistica, which our College of Physicians changed to that of tinctura fatarina. The Edinb. Ph. directed it to be made of three ounces of the sugar and two of the vitriol, to a quart of spirit, and in the heat of the foreign ones. Mr. Boyle recommends it, and our most eminent physicians formerly used it, notwithstanding that some authors consider it as a dangerous medicine, on account of its principal ingredient, the fuscum fatarum, which some call a low poison. Whether it be fo
or not when given in substance, it is certain that there is a
great difference between a corrosive fals so given, and a
tincture made of the same, in spirit of wine, and given in
small doses, as Dr. Mead observes; who adds, that in slow
hectic fevers attended with a balsam; profuse sweats, and
a colliquation of the humours, he reckons two or three
drachms, given at different times, in cooling liquors, every
twenty-four hours, to be a convenient dose. But the usual
dose was from fifteen to thirty drops in Brutfon water, or
some temperate or cool julep.

Concerning the danger of saturnine preparations, when
applied to the purposes of internal medicine, see for George
Baker’s farther Observations on the Poifon of Lead, in
Med. Tranf. vol. ii. p. 446, &c. See also Colica Da-
monitorium, Lead, Saccharum Saturni, and Vinegar of
Lead.

Tincture of Snake-root. See Snake-root.
Tincture of Soot. See Soot.
Tincture of Squills. See Squills.
Tincture of Spanish Flicks, or Tinctura Cantharides. See
Tincture Lythie.

Tinctura Syphica, a form of medicine made with very
little trouble and apparatus, and serving to supply the
place of that elaborate preparation the tincture of Helveti-
tus: it is preferred in the late Lond. Ph., and is to be
made by mixing a drachm of calcined green vitriol with a
quarter of French brandy tinctured by the cafe: this is to
be shook together, that the brandy may turn black, and then
strained off for use.

Tincture of Sulphur. See Sulphur.
Tincture Thebaica. See Tincture of Opium.
Tincture of the Balfam of Toha of the Edinb. Ph., is
made by digesting an ounce and a half of the balfam in
a pound of alcohol in a gentle heat, till the balfam is disso-
volved, and filtering through paper.

This tincture poiffesses all the virtues of the balfam; and
in coughs, and other complaints of the breath, a tea-spoonful
or two of it may be taken in a bit of loaf-sugar.

But it is chiefly used for making the syrup. An ounce
of the tincture, properly mixed with two pounds of simple
syrup, will make what is commonly called the balsamic syrup.

See Syrup.

Tincture of Valerian of the Lond. and Dub. Ph., is
prepared by macerating for fourteen days (seven days Dub.)
four ounces of valerian root in powder, in two pints of
proof-spirit.

The ammoniated tincture of valerian of the Lond. Ph.
is obtained by macerating for fourteen days, four ounces of
valerian root in two pints of aromatic spirit of ammonia,
and filtering. The Dub. Ph. directs two ounces of valerian
root in powder to be digested for seven days in a pint of
spirit of ammonia. It is beneficially employed in hyfeteria
and other nervous affections, in doses of 1/2 to 3/4, given
in milk, or some other bland fluid.

Tinctura Veratri Albi, Tincture of White Hellebore, of
the Edinb. Ph., is made by digesting for seven days, eight
ounces of white hellebore-root bruised, in a pound and a half
of proof-spirit, and filtering through paper. This tincture is
employed to excite vomiting in maniacal and apoplectic cafes,
and as an alternate in cutaneous eruptions. It is given in
doses of 1/2 to 1/2., but its effects are sometimes very vi-
lent. Thomson’s Dispenfatory.

Tinctura Zingiberis, or Tincture of Ginger, of the Lond.
and Dub. Ph., is formed by macerating for fourteen days
(seven days Dub.) two ounces of ginger-root sliced, in
two pints of proof-spirit, and filtering. This is useful as a
stimulant and carminative, in atomic gout when it attacks
the flomach, in flatulent colic, and as a corrector of griping
purgatives.

Tincture is also applied by the Herald to the colours
used in escutcheons, or coats of arms; under which, with
them, are likewise included the two metals, or and argent,
because often represented by yellow and white. See

COLOUR.

Tincture comprehends colours and fur.

The writers on heraldry have had great disputation, which
of these colours or tinctures are the most honourable. All
agree in giving the pre-eminence to the metals gold and sil-
ver, that is, to the yellow and white colours: as to the
others, some esteem them more noble as they approach more
to light, that is, to white. Upton, on this account,
ranges them thus: azure or blue, gules or red, purpure or
purple, vert or green, fable or black: others wholly dif-
ferent from this, and prefer those colours most which can be seen
at the greatest distance; with these, fable or black is the
most honourable or first colour; and they allege the imperial
black eagle, placed in a white field, as an instance of this.
Leigh prefers the red to the blue, as the red has some alliance
to gold, and the blue to silver; the fable is generally pre-
ferr to green and purple, by those who give the red and blue the first places: it is in this efteme on account of its
strong appearance; and green is preferred to purple,
because the latter is but of very late use in heraldry, and is
called a new colour.

All the precedance given to tinctures must however be
considered with this special proviso, that there is no particular
reason for bearing them otherwise in the arms of kings,
doms and families. In all coats of arms there should be
two colours or tinctures; and it is the general rule that the
field should be of a nobler colour than the figures placed upon
it: thus in the arms of Scotland the field is yellow,
and the lion placed upon it red; and if the field consists of
two different colours parted by fefs or by pale, then the no-
blest colour must always be in the belt place, as on the
upper part, or on the right hand of the field; but all these
rules are to be understood with this limitation, that there are
no other special reasons in the family for the contrary. Nef-
bitt’s Heraldry, p. 19.

The two metals, or and argent, and the four colours,
black, red, blue, and green, (see COLOUR,) are the several
tinctures, says Edmondfon, of which the fields and all
charges of arms ought in strictness to be made; excepting,
however, such charges as are to be borne in their own pro-
or natural colour; which bearings, not having in blaz-
on any particular technical or fixed terms, are all com-
prehended under the word proper. As to the tinctures purpur,
tawny, and fanguine, these, being mixtures, are now seldom,
if ever, used, either for fields or charges, though they are
ranked among those, which, as some whimsical heralds say,
have mythical significations, and represent the moral, politi-
cal, and military virtues of those who originally bore their
arms so coloured or tinctured. Some heralds, says the
above-named writer, have blazoned the armorial colours in dif-
terent terms, according to the rank and dignity of the perfon
whose arms they are describing. Accordingly, the arms of
gentlemen, squires, knights, and baronets, are to be blaz-
oned by tinctures; those of nobles by precious stones; and
those of sovereign princes, kings, and emperors, by planets:
but this mode of blazoning would, he thinks, introduce into
the science of heraldry great absurdity and confusion, and
render blazons in some cases very ridiculous.

TINCULEN, or Tinzulen, in Geography, a town of
Africa, in the country of Darah; 120 miles S.W. of Ta-
filet.

TINDAL,
TINDAL, Matthew, LL.D. in Biography, a reputed deist, was the son of a clergyman, and born at Beer-Ferres, in Devonshire, about the year 1652. From Lincoln college, Oxford, into which he was admitted in 1672, he was removed to Exeter college; and having graduated B.A., he was elected fellow of All-Souls college, and became LL.D. in 1685. About this time, the reign of James II., he was beset by some of the popish emissaries, who were then active and indiscriminate in making profesties, and converted to popery; but, upon farther examination, he returned to the church of England in 1687. To the revolution he was ardently attached; and having been admitted an advocate, he often sat as judge in the court of delegates, and had a pension from the crown of 200l. per annum. Tindal was both a political and theological writer, and under the latter description he published "A Letter to the Clergy of both Universities," on the subject of the Trinity and the Arian creed, with a view to some alterations in the Liturgy, which were subjects of discussion. But the treatise that attracted principal notice appeared in 1706, and was entitled "The Rights of the Christian Church asserted against the Romish and all other Priefts who claim an independent Power over it;" with a Preface, concerning the Government of the Church of England, as by Law established." This publication roused the animadversions of the high-church clergy, and the venders of it were legally indicted. The favourable notice taken of this work by Le Clerc, in his "Bibliothèque Choixée," gave great offence to the lower house of convocation; and this learned body circulated a declaration, implicating the foreign critic, and others of similar sentiments, which Le Clerc himself, and many other persons, thought to be unjust and illiberal. Tindal also published a defence of his work, the second edition of which, in two parts, was ordered by a vote of the house of commons, to be burnt in the same fire with Sacheverel's sermons, in the year 1716. Some time after, the lower house of convocation, Atterbury being prosecutor, on a representation of the state of religion in the kingdom, animadverted on the dangerous consequences of the doctrine of necessity. To which Tindal replied, by asserting the truth and usefulness of that doctrine. Of the subjects and tendency of his political writings, it is now needless to give any account. It will be sufficient to observe that he was an advocate for the Hanoverian succession, and for the Whig ministry of that period. Hitherto Tindal had made no direct attack against religion; but in 1730 he no longer disguising his sentiments, which were announced to the public in a treatise entitled "Christianity as old as the Creation, or the Gospel a Reproduction of the Religion of Nature." He disclaims, indeed, in words, opposition to the divine authority of the Christian religion, and denominates himself and his friends "Christian Deists;" but in reality it was his evident and avowed purpose to shew, that there neither has been, nor can be, any external revelation distinct from what he terms "the internal revelation of the law of nature in the hearts of all mankind." Tindal was attacked by Dr. Waterland, who treated him with a degree of contempt which called forth the animadversions of Dr. Middleton. The author, though declining in health, wrote in his own defence, but conceptions of the gall-bladder, with which he had been long afflicted, terminated his life in the year 1733. His remains were interred in Clerkenwell church, agreeable to his own desire, near those of Dr. Burnet, bishop of Salisbury. A second volume of his "Christianity as old as the Creation" was left in MS.; but the publication of it was prevented by Dr. Gibson, bishop of London. His first work had given occasion to so many unanswerable defences of Christianity, that the learned bishop was unnecessarily alarmed, when he prevented further diffusion of this interesting subject.

TINDAL, Nicholas, the nephew of the former, was educated at Exeter college, Oxford, and had different preferments in the church. He died in 1774, at a very advanced age, at Greenwich Hospital, of which he was chaplain. Among his literary undertakings, the most considerable was a translation of Rapin's History of England, with a continuation. Biog. Brit.

TINDALE. See Tyndale.

TINDEL, in Geography, a town of Africa, in the country of Zenhaga, on the sea-coast; 18 miles S.S.E. of Cape Mirik.

TINDERCOTTA, a town of Hindoostan, in the Carnatic; 15 miles E. of Tiiagar.

TINDERO, a town of Sweden, in the province of Mendapedia; 12 miles N.E. of Sundsvall.

TINE, in Agriculture, a term applied to a tooth or spike, which is set or placed in any kind of tool or implement, but especially those of the harrow, drag, and other similar kinds.

Tines for this use should, for the most part, be a little curved or racked forward towards the points, as laying hold of the ground better, and in a more perfect manner. Sometimes tines are necessary to be felled a little in the points and front edges, in order to prevent the wear of them, and render them more effectual in tearing, cutting up, and dividing the land.

TINE, or Tyne, in Geography, a river of England, which rises in two streams, one called the North Tyne, which rises on the borders of Scotland, in the north-west part of the county of Northumberland; the other, which is called the South Tyne, rises about seven miles S. from Aldithome, in Cumberland: both these streams unite near Hexham, from whence the united stream proceeds to Newcastle, and from thence to the German sea, at Tynemouth.

TINEA, a river of France, which rises in the Alps, and runs into the Var, about 12 miles N. of Nice.

Tine, in Medicine. See Porrigo.

Tine, in Natural History. See Moth, &c.

TINH, in Geography, a town of Egypt, situated between the south extremity of lake Menzaleh and the Mediterranean, near the ancient Pelusium, and on a canal formerly called the Pelusian or Bubastie mouth of the Nile; through which Alexander passed with his fleet from Gaza; this canal is now chocked up with mud; 80 miles N.N.E. of Cairo. N. lat. 30° 48'. E. long. 38° 45'.—Allen, a town of Africa, in Tripoli, on a river which runs into the gulf of Sidra. N. lat. 30° 5'. E. long. 15° 12'.

TINÉHALY, a poll-town of the county of Wicklow, Ireland; 41 miles S. by W. from Dublin.

TINEMAN, in our Old Writers, a petty officer in the forlorn, who had the nocturnal care of vert and veinison, and other employments in the forest.

TINÉMAR, in Geography, a town of Ceylon; 10 miles S.W. of Trinamaly.

TINEMOUTH. See Tyne-mouth.

TINET, Tinettum, in our Old Writers, is used for brushwood and thorns to make and repair hedges. In Herefordshire, to tine a gap in a hedge, is to fill it up with thorns, that cattle may not pass through it.

TINETO, in Geography, a small island near the coast of Genoa, at the entrance of the gulf of Spezze. See Tino.

TINEVELLY, or Palamocotta, a city of Hindostan, and capital of a province of the same name, in the Carnatic;
TIN

TINAG, a town of Peru, in the province of Lima; 15 miles S.E. of Cuzco.

TINGIS, Tingier, a town of Africa, situated upon a plain between the promontory, the coasts, and the mouth of the river Valon, according to Ptolemy, which was called Carthage. Mela says that it was a very ancient city, founded by the giant Antaeus. It gave name to Mauritania Tingitana, of which it was the capital. Pliny says that it took the name of Julia Traducta, when the emperor Claudius lent it a colony. Pharamus, in Strabo, calls it Tingena, and says that a son of Tinga by Hercules, called Sophax, founded it, and gave it the name after that of his mother.

TIN-GLASS, a name frequently given to the semi-metal bifmuth.

TING-NGAN, in Geography, a town of China, of the third rank, in Kiang-tcheou, in the island of Hainan.

TINGO, or Tenna, a town of Italy, which runs into the Adriatic, 3 miles N. of Fermo.

TINGORAN, a small town in the Chinese sea, near the coast of Malaca. N. lat. 4° 18'. E. long. 103° 33'.

TINGORALLY, a town of Hindoostan, Malacca; 40 miles W.S.W. of Calcutta. N. lat. 22° 4'. E. long. 87° 52'.

TINGRACALLY, a town of Bengal; 16 miles E. of Mahmoudpur.

TINGRECOTTA, a town of Hindoostan, and Baramaul; 16 miles S.E. of Darampore.

TINGRI, a town of Tibet. Here the Nepalese were defeated by the troops of China in 1792; 22 miles S.W. of Zungang.

TING-TCHEOU, a city of China, of the first rank, in Fo-kien; 870 miles S. of Peking. N. lat. 25° 48'. E. long. 116° 4'.

TINGUIRICA, a river of Chili, which runs into the Rheel; 40 miles from its mouth.

TINGUZGALPA, a town of Mexico, in the province of Nicaragua; 80 miles N.W. of Leon.

TINGWALLA, an island of Shetland; 4 miles W.N.W. of Lerwick.

TINTAGELL, a town of the island of Shetland; 4 miles W.N.W. of Lerwick.

TINIAN, a cluster of small islands in the Chinefe sea, near the coast of Malaca. N. lat. 2° 25'. E. long. 102° 31'.

TINIGA, a town of Peru, in the province of Lima; 15 miles S.E. of Cuzco.

TINIGS, Tingier, a town of Africa, situated upon a plain between the promontory, the coasts, and the mouth of the river Valon, according to Ptolemy, which was called Carthage. Mela says that it was a very ancient city, founded by the giant Antaeus. It gave name to Mauritania Tingitana, of which it was the capital. Pliny says that it took the name of Julia Traducta, when the emperor Claudius lent it a colony. Pharamus, in Strabo, calls it Tingena, and says that a son of Tinga by Hercules, called Sophax, founded it, and gave it the name after that of his mother.

TIN-Glass, a name frequently given to the semi-metal bifmuth.

TIN-NGAN, in Geography, a town of China, of the third rank, in Quang-tong, on the river of Limou; 17 miles S. of Kiong-tcheou, in the island of Hainan.

TINGO, or Tenna, a town of Italy, which runs into the Adriatic, 3 miles N. of Fermo.

TINGORAN, a small town in the Chinese sea, near the coast of Malaca. N. lat. 4° 18'. E. long. 103° 33'.

TINGORALLY, a town of Hindoostan, Malacca; 40 miles W.S.W. of Calcutta. N. lat. 22° 4'. E. long. 87° 52'.

TINGRACALLY, a town of Bengal; 16 miles E. of Mahmoudpur.

TINGRECOTTA, a town of Hindoostan, and Baramaul; 16 miles S.E. of Darampore.

TINGRI, a town of Tibet. Here the Nepalese were defeated by the troops of China in 1792; 22 miles S.W. of Zungang.

TING-TCHEOU, a city of China, of the first rank, in Fo-kien; 870 miles S. of Peking. N. lat. 25° 48'. E. long. 116° 4'.

TINGUIRICA, a river of Chili, which runs into the Rheel; 40 miles from its mouth.

TINGUZGALPA, a town of Mexico, in the province of Nicaragua; 80 miles N.W. of Leon.

TINGWALLA, an island of Shetland; 4 miles W.N.W. of Lerwick.

TINIAN, a cluster of small islands in the Chinefe sea, near the coast of Malaca. N. lat. 2° 25'. E. long. 102° 31'.

TINIGA, a town of Peru, in the province of Lima; 15 miles S.E. of Cuzco.

TINIGS, Tingier, a town of Africa, situated upon a plain between the promontory, the coasts, and the mouth of the river Valon, according to Ptolemy, which was called Carthage. Mela says that it was a very ancient city, founded by the giant Antaeus. It gave name to Mauritania Tingitana, of which it was the capital. Pliny says that it took the name of Julia Traducta, when the emperor Claudius lent it a colony. Pharamus, in Strabo, calls it Tingena, and says that a son of Tinga by Hercules, called Sophax, founded it, and gave it the name after that of his mother.

TIN-Glass, a name frequently given to the semi-metal bifmuth.

TIN-NGAN, in Geography, a town of China, of the third rank, in Quang-tong, on the river of Limou; 17 miles S. of Kiong-tcheou, in the island of Hainan.

TINGO, or Tenna, a town of Italy, which runs into the Adriatic, 3 miles N. of Fermo.

TINGORAN, a small town in the Chinese sea, near the coast of Malaca. N. lat. 4° 18'. E. long. 103° 33'.

TINGORALLY, a town of Hindoostan, Malacca; 40 miles W.S.W. of Calcutta. N. lat. 22° 4'. E. long. 87° 52'.

TINGRACALLY, a town of Bengal; 16 miles E. of Mahmoudpur.

TINGRECOTTA, a town of Hindoostan, and Baramaul; 16 miles S.E. of Darampore.
TINIAN, in Geography, one of the Ladrone islands, in the North Pacific ocean, about 42 miles in circumference, first discovered by the crew of a Manila ship, which was cast away here in the year 1538. The author of Anfon's Voyage gives a pleasing description of this island, as found by the crew of the Centurion, in the year 1742. Commodore Byron, who visited it in the year 1765, and anchored on the south-west end of the island, in the same place where the Centurion lay, instead of delightful lawns, found the trees and underwood so thick, that in endeavouring to force a passage through, they were entangled and cut as if with whip-cord. After they had cleared the weed, which they imagined was the same at which lord Anfon filled his casks, commodore Byron found the water brackish, and full of worms. He says, "the road also where the ships lay was a dangerous situation at this season (Auguftr 1st), for the bottom is a hard sand, and large coral rocks; and the anchor having no hold in the sand, is in perpetual danger of being cut to pieces by the coral; to prevent which as much as possible, I rounded the cables, and buoyed them up with empty water-casks. Another precaution also was taught me by experience, for at first I moored, but finding the cables much damaged, I resolved to be single for the future, that by veering away, or leaving in, as we should have more or less wind, we might always keep them from being slack, and consequently from rubbing, and this expedient succeeded to my will. At the full and change of the moon, a prodigious swell tumbles in here, so that I never saw ships at anchor roll so much as ours did while we lay here; and it once drove in from the westward with such violence, and broke so high upon the reef, that I was obliged to put to sea for a week; for if our cable had parted in the night, and the wind had been upon the shore, which sometimes happens for two or three days together, the ship must inevitably have been loft upon the rocks. I soon found that the island produced limes, four oranges, cocoa-nuts, bread-fruit, guavas, and papaus in abundance; but we found no watermelons, feertry-grafs, or forest. Notwithstanding the fatigue and difficulties that we had endured, and the various climates we had passed through, neither of the ships had yet lost a single man since their failing from England, but while we lay here two died of fevers, a disease with which many were seized, though we all recovered very fast from the fever. I am indeed of opinion that this is one of the most unhealthy spots in the world, at least during the season in which we were here. The rains were violent, and almost incessant; and the heat so great as to endanger suffocation: besides the inconvenience which we suffered from the weather, we were incessantly tormented by the flies in the day, and by the mufquitos in the night. The island also swarms with centipedes and scorpions, and a large black ant, fearfully inferior to either in the malignity of its bite. Besides these, here were venomous insects without numbers, altogether unknown to us, by which many of us suffered so severely, that we were afraid to lie down in our beds: nor were those on board in a much better situation than those on shore, for great numbers of these creatures being carried into the ship with the wood, they took possession of every birth, and left the poor seamen no place of rest either below or upon the deck. Our principal resource for fresh meat was the wild hog, with which the island abounds. These creatures are very fierce, and some of them are so large, that a carcase frequently weighs 200 pounds. Mr. Gore, one of our mates, at last discovered a pleasant spot on the north-west part of the island, where cattle were in great plenty, and whence they might be brought to the tents by sea. We were now upon the whole pretty well supplied with provisions, especially as we baked fresh bread every day for the sick; and the fatigue of our people being less, there were fewer ill with the fever; but several of them were so disordered by eating a very fine-looking fish which we caught here, that their recovery was for a long time doubtful. The author of lord Anfon's voyage says, that the people on board the Centurion thought it prudent to abstain from fish, as the few which they caught at their first arrival surfeited those who eat of them. Besides the fruit that has been mentioned already, this island produces cotton and indigo in abundance, and would certainly be of great value if it were situated in the West Indies. The surgen of the Tamar enclosed a large spot of ground here, and made a very pretty garden, but he did not stay long enough to derive any advantage from it. Captain Wallis touched upon this island in 1767; and obtained beef, pork, poultry, papaw apples, bread-fruit, limes, oranges, and every refreshment mentioned in the account of lord Anfon's voyage. The sick began to recover as soon as they went on shore; but flesh meat would not keep sweet for scarcely one day. N. lat. 14° 55'. W. long. 214° 7'.'

TINICUM, a township of Pennsylvania, in the county of Bucks, containing 1017 inhabitants; 20 miles N. of Philadelphia.—Alfo, a township of Pennsylvania, in the county of Delaware, containing 249 inhabitants.

TINNETZ, a town of Austrian Poland; 4 miles W. of Cracow.

TINIMA, a town of the island of Cuba; 22 miles W.N.W. of Bayamo.

TINING, in Agriculture. See TINE. See also TILLAGE.

TININGBURG, in Geography, a town of Hungary; 16 miles N. of Presburg.

TINISSI, a town of Bohemia, in the circle of Konigigratz; 10 miles S.E. of Konigigratz.

TINIT, a town of Africa, in Zanzibar, on the coast; 25 miles S.S.E. of Cape Mirik.

TINJULEEN, a town of Africa, in the country of Darah; 105 miles S.E. of Morocco. N. lat. 29° 30'. W. long. 2° 30'.

TINKER'S ISLAND, one of the Elizabeth's Islands, near the coast of America.

TINKLING or Tingling of the Ear. See TINGITUS.

TINMOUTH, in Geography, a post-town of the state of Vermont, in the county of Rutland, containing 1001 inhabitants; 8 miles S. of Rutland.—Alfo, a town of Nova Scotia, on the east coast, formerly called Pittow.

TINNA, or TINA, in Ancient Geography, a river of the isle of Albion, between the gulfs Tana and Boderia, according to Tolemy, supposed to be the river Eden, in Fife. —Alfo, a small river of Italy, in Picenum.

TINNE, in Geography, a town of Africa, in Msina, on the north side of the Niger; 130 miles W.S.W. of Tombooto.

TINNING, the covering or lining any thing with melted tin, or with tin reduced to a very thin leaf.

Looking-glass is foliated or tinned with thin leaves of beaten tin, applied and fastened to them by means of quicksilver. See Looking-Glass.

Kitchen utensils are tinned with melted tin; and locks, bits, spurs, &c. with leaf-tin, by the help of fire.

For the method of tinning iron-plates, see LATTIN and Tin-Plates.

Copper and brass are covered over with tin by the help of Sal ammoniac, the acid of which cleans the surface of the metals.
metals to be tinned, and the oily matter contained in it furnishes the phlogifon (according to the old system) that is necessary in this operation. The copper, or brass, being made hot enough to melt tin laid upon it, is interleaved over with fial ammoniac, and the melted tin rubbed about the plate. The fial ammoniac takes up the dross of the tin, and leaves the tin to flow freely upon the metal. As the surface of copper is continually altered by the mere action of the air, the workmen, before the tinning of any vessel, scrape its surface with a fied instrument till it be clean and bright; then they place the vessel upon kindled coals, and heat it to a certain degree: as soon as it is hot, in some processes of tinning, they rub it with pitch, and apply the melted tin, which they spread upon the surface of the copper by means of bars. For this purpose pure tin is seldom used; but, in general, two parts of tin are alloyed with one part of lead.

The pitch used in this latter mode of tinning is quite necessary, because the degree of heat given to the copper is sufficient to calcine its surface in some degree; and this alteration, however slight, would prevent the perfect adhesion of the tin, unless by means of the pitch the phlogifon was restored to it at the very instant of the application of the tin. The pitch also prevents the flight calcination which would happen on the surface of the tin, or revives the small particles of calx which are formed during the operation. In either way, or in the method of tinning iron plates, the success of the operation depends on the facility with which tin unites with these metals, which incorporates with them, diffuses in some measure their surface, and forms a kind of alloy, at least when the tinning is well performed; and moreover, on the cleanliness of the surfaces, both of the melted tin, and of the copper or iron to which it is applied; for the metals cannot perfectly unite unless they are in a metallic state, and free even from their own earth or calx.

It has been alleged that copper vessels, so pernicious in themselves, are not perfectly preferred from rust or verdigris by tinning; and, besides, tin itself is combined with arsenic, and lead is also used in tinning. M. Malouin has, therefore, proposed in his Memoirs on Zinc (Mem. de l'Acad. Sc. 1742.) to substitute that metal in place of lead and tin, for the tinning of iron and copper vessels; the greater hardness of the zinc, it is thought, would render it less liable to be worn, and the dangerous effects of lead and tin would be avoided. Macquer's Dict. Chem. Engl. edit.

The plumbers, on some occasions, tin or whiten their sheets of lead; in order to which they have a tinning furnace, filled with live coal, at the two sides of which two men are placed, who hold up the sheets over the fire to heat: and the tin-leaves being laid over them, as fast as the sheets grow hot, and the tin melts, they spread it, and make it take by rubbing it with towel and rain.

TINNITUS AURINUM. A very common disease in the fenes of hearing, is when certain sounds, like those of a drum, a bell, the falling of water, &c. are heard, when no such noises actually exist, or can be heard by other persons. This affection is called tinnitus aurium, of which various kinds have been oberved. For the most part, it is a very light transient disorder; but sometimes it is most obstinate, long continued, and troublesome. It sometimes arises from the flighted case, such as any thing partially flapping up the meatus auditorius, or Euftachius tube itself, so that the free passage of air into the cavity of the tympanum is interrupted. A kind of tinnitus is heard by the most healthy when they yawn.

A much more frequent and troublesome species of tinnitus accompanies many diseases both of the feble and nervous kind. This is said to be occasioned partly by the increased impetus of the blood towards the head, with an increase of sensibility in the nervous system itself, so that the very beatings of the arteries are heard; and partly by the augmented irritability and spasmatic motions of the little muscles within the organ of hearing. In fevers, the throbbing of the carotid arteries at the sides of the fella turcica has produced excusive annoyance in particular individuals, especially when they were in the recumbent posture; and the celebrated Haller informs us, that when he was afflicted with fever, he suffered much from the beating sensation caused in his ears, as he suppos'd, from the pulsation of the carotids in the neighbourhood of those organs.

According to writers, tinnitus aurium sometimes arises from a vehement affection of the mind; sometimes from a disorder in the stomatch; sometimes from rheumatism extending its effects to the ears and head; or from a catarrh, producing a temporary obstruction in the Euftachian tube. In the foregoing examples, the cure of the affection of the ear depends upon the removal of the other disorders, of which it is merely an effect.

In certain cases, tinnitus aurium occurs as a separate independent disorder, and may be the caufe of long-continued, distressing suffering. The existence of unreal sounds in the organ of hearing generally prevents the patient from hearing distinctly other fonorous impressions, and, of course, more or less deafness is a common attendant of the complaint.

The writer of this article lately had a patient, who is attacked five or six times every year with tinnitus aurium, which ceases for several days the most annoying sensations in the ears, and a considerable degree of deafness. The disorder is always accompanied with severe pain in the branches of the nerve coming out of the infra-orbital foramen, head-ache, indigestion, and many symptoms of the nervous and bilious kind.

In this case, relief is obtained by fomenting the affected ear with a decoction of poppies, and washing out the meatus auditorius with a fyring and warm water. However, these means are always affiliated with a few doses of calomel and rhubarb, without which, in all probability, the local applications would not entirely answer.

We have also had other cases, in which a strong solution of opium in water, camphorated oil, blisters, &c. were the remedies employed.

The tinnitus aurium, produced by fevers, sometimes does not subside at their termination, but lasts, either in a continued or periodical form, during life. Two such infancies are now within our own recollection; and every man of experience must have witnessed the fame thing.

TINNUNCULUS, in Ornithology, the name of one of the long-winged hawks, called by Linneus Falco tinnunculus; which is it.

It is about the size of a common pigeon. Its bill is short, crooked, and very sharp, and covered with yellow skin at the top; near this the bill is white, elsewhere it is blue; its tongue is biff; its mouth very wide, and its palate blue; its head is large and flattened, and is of an ash-colour, with longitudinal streaks of black; its back and wings are brown, variegated with black spots; its rump is grey, with some transverse black spots; and its breast and belly of a pale rust-colour, with a few longitudinal streaks of black; its tail is long and pointed, its tip of a pale ferruginous hue, with a broad transverse streak of black over it; and the rest of the tail is a mixed grey and brown, with black spots and streaks; its legs and feet are of a fine yellow.

The tinnunculus, or keelrel, breeds in the hollows of trees, in the holes of high rocks, towers, and ruined buildings:
buildings: it lays four eggs, which are white, variegated with a number of red spots; its food is field-mice, small birds, and insects.

This is the hawk which we so frequently observe in the air fixed in one place, and as it were fanning with its wings, at which time it is watching for its prey. It flings up the indiglided fur and feathers in form of a round ball. Ray and Pennant.

TINO, in Geography, a small island near the coast of Genoa, at the entrance of the gulf of Spezzia; 8 miles S. of Spezza. N. lat. 44° 3'. E. long. 9° 40'. See Tineto.

Tino. See Texos.

The form of this island is oval, about 60 miles in circumference. It is mountainous, but its rich plains are decked by the opulence of industry. Its fruits are excellent and its wine good; but the most abundant of its productions is silk, which is manufactured by the females, who are highly commended for the beauty of their perfons and the elegance of their dress. The inhabitants are active and industrious, most of whom are of the Greek church, though it is the seat of a Roman Catholic bishop. It is reckoned one of the most agreeable islands of Greece, but has no good harbour. The small town of San Nicolo is built on the ruins of the ancient Tinos. Its capital bears the name of the island. N. lat. 37° 30'. E. long. 25° 8'.

Tinphadum, or Tiphadum, in Ancient Geography, a place of Africa, in Numidia, upon the route from Theveti to Sittens, between Thevetie and Vegefolis. Ant. Itin.

TINSEDA, in Geography, a town of Africa, in the country of Darah. N. lat. 27° 30'. W. long. 5° 46'.

TINTA, a town of Peru, in the bishopric of Cufco, and jurisdiction of Canas y Canches, sometimes also called Tinta; 60 miles S. of Cufco.

TINTENIAC, a town of France, in the department of the Ille and Vilaine; 9 miles S.E. of Dinan.

Tintinabulum, among the Ancients. See Bell. Tinto, in Geography, a river of Spain, in the province of Seville, which owes its name to its waters being tinged of a yellow colour. It is also of a petrifying quality; and it is said that it destroys all verdure, and that no fish can live in it. Its nature, however, is changed by the confluence of other rivulets; for when it passes by Niebla, it is not different from other rivers: and it falls into the Atlantic, six leagues lower down, at the town of Huelva, where it is two leagues broad, and admits the passage of large vessels as high as San Juan del Puerto, three leagues above Huelva.

TINTON, a town of the state of New Jersey, near the sea; 12 miles E. of Freehold, in the county of Monmouth.

TINTOQUE, a town of Mexico, in the province of Xalisco; 45 miles S.S.W. of Compotella.

Tintoretto, II., in Biography, the cognomen of a celebrated Venetian painter, whose real name was Giscopo Robuuti. He was born at Venice in 1512, the son of a dyer; from whence he acquired the name of II Tintoretto. His natural disposition towards the art of drawing manifested itself very early, and his father had the wisdom to indulge it; and feeling it likely to lead to something decisive, caused him to be instructed in painting, and finally placed him as a pupil with Titian, then in the prime enjoyment of his reputation and power. It is a painful thing to relate, and a severe lesson to the pride of the most able, that where so much ability, so much honour and wealth abode, the mean and degrading passion of jealousy should have found encouragement. Titian, the great, the honoured Titian, that man who possessed a mind capable of grasping almost all the art of painting required, who was richly and highly honoured, courted, and employed, is said (and the truth of the story rests upon too found authority) to have been with the corroding pangs of jealousy the early essays of his pupil Tintoretto, and to have permitted it to operate so strongly upon him, that he excluded the dreaded object from his house, about ten days after his admission.

But the aspiring talents of the young painter were not to be damped by so mean a measure, though even in the powerful hands of Titian. To him disaffection from the eye of a master was emancipation. He dared to think for himself, and boldly aimed at election in art, and an union unthought of till then; and as Lanzi says, generously aspired at the honour of being the founder of a school and style of his own, by combining the form of the great Florentine, M. Angelo, with the colour of his former master. To maintain a due excitement to the performance of so bold an undertaking, he wrote upon the wall of his study, "I l'ingegno di Michel Angelo e il colorito di Tiziano;" and with all the ardour of an intrepid mind, endeavoured to perfect the task he had assigned himself, by copying whatever pictures of Titian he could procure during the day, and drawing by night from calcts taken from the works of M. Angelo, together with many others he procured from ancient respectable statuary. It is doubtless to his studies by night and the lamp, that he acquired that perfect mastery of chiaro- scuro, those decided masses of light and shade, which distinguishes his works, both in his groups and single figures. Add to these labours, that he modelled in wood and clay, and cloathed his figures rudely, arranging them in different lights, and sometimes hanging them from the ceiling, to acquire, by drawing from them in that position, the knowledge of the figlio in fis, then much in use for the adornment of ceilings, and in the houses of the grandees. By these deep studies, and a perfect knowledge of anatomy, he was enabled to exert the exuberant and glowing fancy with which nature had blessed him, in the freest and boldest manner; and had he always applied his powers with equal intenseness with a careful discrimination of what was due to his own honour, there can be no doubt but that he would have left a name unrivalled in art. This for some time he attended to, and some of his best works lack only character and expression to place them in the highest rank. The large picture which lately adorned the walls of the Louvre, but is now returned to its original sitation, the Scuola di S. Marco at Venice, is a work of this class, which he painted when only 36 years old; and another is the Crucifixion, in the Scuola di S. Rocco. The former is known by the name of II Servo, and represents the miracle of St. Mark defending, and breaking the bonds of a slave condemned to death by Turks. Grand but not correct in its style of design, astonishing the mind by the intrepid boldness of its colour and execution, it displays more complete mastery of the materials of art than is to be found in the works of any other painter. If there be any fault in this astonishing performance, it is that the subject is lost in the splendour of the execution, the spirit in the matter in which it is embodied. The fame cannot be said of the Crucifixion above mentioned, in which the glowing deep and ominous tone preserved through the whole, produces the most perfect unity, gives strength of expression to the picture, and overwhems the spectator with terror. All seems to be hushed in silence round the central figure of the Saviour suspended on the crosses, with his faithful mother, and a group of male and female mourners at his feet; and though many are the improprieties of costume and of action, yet all vanish in the power which comprefses them to a single point, and we do not detect them till we recover from the first impression. Unhappily for his fame, he was not always so careful in his labours;
labours; and the impetuosity of his mind, or perhaps the feelings of his employers, who were numerous, did not allow him sufficient time to do justice to himself; and he permitted many pictures to leave his studio, possessing only the freedom of colour and execution which peculiarly belonged to his pencil.

Tintoretto was so certain of his execution, that he is said by Sandrart to have frequently wrought without a previous sketch, or any preparatory outline, finishing as he went on, and adapting his labours to the price he was to receive; not sufficiently considering that his works would outlive their author, and deprive him of a large portion of the fame so justly due to his power, when efficiently exercised. It was, therefore, truly observed by An. Caracci, that in some of his works, Tintoretto was not inferior to Titian, while in others he fell below himself.

One remarkable influence of his intrepidity and impetuosity of genius, and promptness of execution, is related by Vasari, viz.: The confraternity of S. Rocco at Venice had determined to decorate their church with a picture of the apotheosis of their patron saint, and defirous of having the choice of good designs, commissioned some of the most eminent artists to make compositions for their erection. Paolo Veronese, A. Schiavone, Salviati, Zuccherio, and Tintoretto, were the competitors. On the day appointed for their decision, the good fathers were astounded to find a finished picture by Tintoretto placed in the appointed situation; and when they remonstrated upon fo extraordinary a proceeding, as they had only required a design from him, he told them that was his way of making designs, and that if they hesitated to pay him for his trouble, they were welcome to the picture, which was allowed to keep possession of its honours. His compeers rendered due justice to fo extraordinary an exertion, and denominated him Il furioso Tintoretto.

To do justice to the power of Tintoretto, he must be contemplated on the grand theatre of his pictorial existence, viz. at Venice, where alone his grander works are to be found; and there the public buildings are filled with them, in the higher and lower degrees of excellence. In style, the grandeur which he borrowed of Michael Angelo was rather muscular enlargement of line, and that not always correct, than feclct or characteristic; and it is not often that he rises above common nature; mostly so in his female characters, though they are often too slender for truth of action, and too affected for grace. His touch is delightfully free, with a full impaso of colour, and his chiaroscuro of the richest and most brilliant kind. He lived to the great age of 82, and died at Venice in 1594.

Tintoretto left a daughter named Marietta Robusti, who was born at Venice in 1560, and whom he instructed in the art of painting, principally in portraiture, in which she acquired considerable practice and reputation; painting many of the principal personages in her native city. She had the honour to be invited to the courts of the emperors Maximilian and of Philip king of Spain; but her father would not be prevailed upon to part with her. She died soon after him, in 1590. He left also a son, Domenico Robusti, who practiced the art with considerable success, though not with the fire of invention or execution which characterized his father’s productions. He was born at Venice also, in 1562. His principal works are in the Sala di Coniglio and the Scuola di San Marco at Venice. Portraiture was, however, his principal occupation, and most suited to his genius; and he had the honour of being eminently patronized. He died in 1637.

TINURTIUM, Tournus, in Ancient Geography, a town of Gaul, on the route from Lugdunum to Gergovia. Anton. Itin.

TINUS, in Botany, a name in Pliny, book 15, chap. 39, for what he says is sometimes termed a sort of wild laurel, and is distinguished by the blue colour of its berries. This description is universally agreed to apply to our Laurus-tinus, Vitanum Tinus of Linnaeus; a plant likewise indicated by Ovid’s

*Etot bicolor myrtus, et bacis coroala tinus.*

Linnaeus has transferred this name to a West Indian shrub, supposed by him to constitute a new genus, having some resemblance to the above shrub.—Linn. Gen. 200. Schreb. 276. Jull. 264. and 451.—Cliffs and order, Eneacandra Menegynia.

The characters of this however were discovered by Swartz to be founded in error, the plant being a genuine species of CLEITHRA; see that article, n. 5.

The origin of the word Tinus has been fought by Vaillant in the Greek *tinos*, small, or dwarf, as meaning a smaller or more humble kind of laurel; but this is scarcely correct, nor does the derivation by any means satisfy us.

TINZ, in Geography, a town of Silezia, in the principality of Brie; 22 miles W. of Brie.

TINZULIN. See TINULEN.

TIO, a town of South America, in the province of Cordova; 70 miles E. of Cordova.

TIOGA, a county of New York, erected from Montgomery county in 1751, and from the E. part of this county. The county of Brome was erected in 1806. Tioga is bounded N. by a small angle of Steuben county, and by Seneca and Cayuga counties; E. by Brome county, S. by the state of Pennsylvania, and W. by Steuben county. Its form is nearly that of a square, 26 by 34 miles; its area 571,506 acres: between 42° 54' and 42° 25' lat., and 2° 14' and 3° W. long. from New York. Its towns are Condor, Caroline, Catharinas, Cayuta, Chemung, Denby, Elmira, Owego, and Spencer its capital. Its eastern part is traversed by the Susquehanna; and the Tioga, the principal W. branch of that river, waters the S.W. part. The surface is considerably broken and hilly. It is rapidly increasing in population, and contains a large proportion of good farming land. Rafts, arks, and small boats descend the waters of this county, and find the principal market at Baltimore, in Maryland. Tioga sends one member to the house of assembly.

Tioga, a large township in the S.W. corner of Brome county, 13 miles W. of Chenango Point; bounded N. by Berkshire, E. by Union, S. by the state of Pennsylvania, and W. by Tioga county; about 15 miles long from N. to S., and 7 broad, having the Susquehanna running W. across its centre. The soil is various, and the surface uneven. It yields various kinds of trees, grain, and pasture. Fruit in general succeeds well, and apples are no where better. This town has been settled since about 1790. —Alto, a river of New York, which runs into the Susquehanna at Tioga Point, N. lat. 41° 56', W. long. 76° 33'.

TIOLO, a town of Italy, in the Valtelline; 10 miles S.W. of Bormio.

TION, a river of France, which runs from the lake of Annecy to the Siers.

TIOOKIEA, one of King George's islands, in the South Pacific ocean, discovered by commodore Byron. It is a low island, with a large lake in the centre. Captain Cook went to examine a creek, which he supposed communicated with the lake. They found the creek fifty fathoms wide at the entrance, and thirty deep; farther in thirty wide and twelve deep; the bottom everywhere rocky, and the sides bounded with coral rocks: dogs seemed to be in great plenty, but no fruit
fruit was seen but cocoa-nuts. The inhabitants of this island, and perhaps of all the low ones, are of a much darker colour than those of the higher islands, and seem to be of a more savage disposition. This may be owing to their situation, nature not having bestowed her favours on these low islands with that profusion she had done to some of the others. The inhabitants are chiefly beholden to the sea for their subsistence; consequently are much exposed to the sun and weather, and by that means become more dark in colour, and more hardy and robust, for there is no doubt of their being of the same nation. Captain Cook's people observed that they were stout well-made men, and had marked on their bodies the figure of a fish, a very good emblem of their profession. S. lat. 14° 27'. W. long. 144° 56'.

TIPASA, in Ancient Geography, a town of Italy, in the country of the Sabines, on the route from Reate to Liffa, between Latia and Liffa.

TIORNEBIERG, a small island in the Baltic, near the south coast of Lolland. N. lat. 54° 42'. E. long. 11° 18'.

TIPRESA, a town of Hindostan, in Oude; 10 miles S.E. of Goorapour.

TIPARENUS INSULA, now Specia, in Ancient Geography, the isle of Tiparenus, situated in the Argolic gulf, separated by a small canal from the continent, which established a communication between the gulf of Hermione and the Argolic.

TIPASA, TIPA, a town of Africa, in Mauritania Cesariana, according to Ptolemy and the Itin. Anton. having the title of colony, and situated on the route from Carthage to Tingis, between Cerasarea Colonia and Casa Calunti. It still prefers its ancient port, and has some remains of ancient walls.

TIRE, or TYPE, in Rural Economy, a trap or device of the wooden box, or excavated earth kind, for catching or taking rabbits, &c. These traps or nets are set or formed in a particular track at the time the rabbits have departed from the warrens, or parts of them, in search of food, all the other holes or ways of return being flapped up. Dogs are then employed in forcing the rabbits to return, when they are taken in the traps or nets. The traps are formed of different numbers and sizes, according to the nature and extent of the warren.

TIPER, or TIPA, in Geography, a country of Asia, annexed to Bengal, bounded on the N. by Silhet, on the E. by Ava, on the S. by Chittagong, and on the W. by Daec, about 100 miles long, and 50 broad: the inhabitants are said to be most subject to goitres or wens in the throat, a disease generally attributed to the water drank. Comilla is the chief town. A town of the same name is laid down in some maps, as situated on the river. N. lat. 24° 20'. E. long. 118°.

TIPHA, in Ancient Geography, a small town of Greece, in Bucotia, situated on the gulf of Corinth, in which was a temple of Hercules, whose feast was annually celebrated. Paulanias.

TIPICA PRINCEPS, one of the Hebrew accents, sometimes serving for a comma, and marked under a letter (').

TIPHA, in Entomology, a genus of the Hymenopterous order of insects, in the Gmelinian frymer of Linnaeus; the characters of which are, that the mouth has a membranous roundish jaw, a mandible arched, and acute, a short tridentated lip, and no tongue; the feelers are four, filiform, unequal, stretched out in the middle of the lip; and the antennae unifiliform and arched. This genus includes the following species.

- Vespaformis. Black, with a ferruginous abdomen, black at the base, and cyanous wings. The sphex vespaformis of Fabricius. Found in Malabar.
- Grassicornis. Black, the abdomen with three bands, the legs ferruginous, and the wings cyanous. Found in Spain.
- NIGRA. Black, without spots. An European insect.
- MEMORATA. Black, with the four hinder thigs angulated and red. Found in England.
- Histrionica. Black, thorax maculated, abdomen with five yellow bands, the two foremost interrupted. Found in China.
- Quinquecincta. Black, thorax spotted, abdomen with five yellow bands, the second interrupted. Found in England.
- Ciliata. Black, the segments of the abdomen yellow, with ciliated margin. Found in Spain.
- Hesperaethus. Black, the abdomen with five yellow spots on each side, the toes and legs red. Found in South America.
- Ephippium. Black, the thorax with a red dorval spot. Found in South America.
- Radula. Hairs black, thorax reddish before, the second and third segments of the abdomen yellow. Found in New Holland.
- Dorsata. Black, the second and third segments of the abdomen yellow. A Comandell insect.
- Rupicormis. Ferruginous spotted with black, yellow abdomen, and four black bands. Found in Tranquebar.
- Tricincta. Black, the abdomen with three yellow bands, the anus and legs ferruginous. Found in South America.
- Collaris. Black, the thorax on the fore-part cinerous villous, behind reticu, with cinerous wings. Found in Malabar.
- Pedestrus. Apterous, black variegated with yellow, thorax compressed. Found in New Holland.
- Tiphle, in Ichthology, a name by which some authors express the acus, or tobacco-pipe fish.
- TIPICA, in Geography, a town of Peru; 30 miles E. of Lipis.
- TIPING, a town of Corea; 25 miles S.E. of King-kia-tao.
- TIPOCA, or TAPICA, a town given by some authors to a fort of cream or flour made from the yucca or manihot-root, by maceration of it in water, after expressing the juice.
- TIPOR, in Geography, a town on the west coast of Celebes. S. lat. 2° 5'. E. long. 119° 22'.
- Tippacanos Creek, a river of North America, which
which runs into the Wabash, N. lat. 40° 18'. W. long. 86° 56'.

TIPPALE, a river of England, in Northumberland, which runs into the Tyne, near Haltwhistle.

TIPPERARY, a county in the province of Munster, Ireland, extending in a very irregular form between the King's and Queen's counties on the north, the latter county and that of Kilkenny on the east, the counties of Waterford and Cork on the south, and those of Limerick, Clare, and Galway on the west. From the two latter counties, the river Shannon forms a natural boundary; as the river Suir does from Waterford for about 14 miles on the south. The length from north to south is 52 Irish (or 734 English) miles, and its breadth 31 Irish (or 393 English) miles. It contains 554,690 acres, or 867 square Irish miles, equal to 823,988 acres, or 1,420 square English miles, including bogs, mountain, and waste. There are twelve baronies, two of which, Upper and Lower Ormond, gave the title of duke, as they now do that of earl, to the family of Boteler, or Butler, so distinguished in Irish history. The population of Ireland not having yet been satisfactorily ascertained, little can be said on the subject. Dr. Beaufort stated the number of houses in 1792, at 30,705; and from the means of information he had, and his usual accuracy, there can be little doubt of his correctness: but from the great increase of tillage since that time, the number of houses must have increased, though Tipperary has had more caucuses to retard this increase than any other county in Ireland: 30,703 haunds, at an average of 4½ souls per house, would be about 169,000; but if, according to Mr. Buffle's opinion, as given in the Tracts of the Irish Academy, we take 6½ as the average, it would exceed 190,000, a very small population for such an extent of ground. The number of parishes is 187, which, when Dr. Beaufort wrote, were comprised in 63 benefices, and had only 46 churches. A number of churches have however been since built, as well as several glebe-houses, and some benefices have been divided; to which the exertions of the present archbishop of Cashel (Brodrick) have greatly contributed. Unions of parishes which were formed, when from the state of the country the income of a parish was very small, and the number of inhabitants very few, are now as unnecessary as they are injurious. The archbishopric of Cashel, and bishopric of Emily, which are united, contain 116 parishes, Waterford 32, and Killaloe 41. Tipperary returns four members to the imperial parliament, two knights of the shire, and two for the boroughs of Clonmel and Cashel. This reduction was less than in most other counties, as Tipperary had only three boroughs before the Union, of which Feather was disfranchised. Though the towns represented are considerable ones, especially Clonmel, yet the boroughs are both what are called close ones, the proprietors in fact exercising an undisputed right of chusing the member. The lands of Tipperary have been always ranked amongst the most productive in Ireland, and one tract in particular, including the neighbourhoods of Tipperary and Cashel, has been called the Golden vale, on account of its extraordinary fertility. It has however been always a great grazing country; and as this system drives the peafantry into barren mountains, or forces them to crowd into towns and villages, that they may procure a precarious and wretched subsistence, they too commonly become turbulent, violent, and discontented. Whether this be the cause or not, such is certainly the character of the peafantry of this county, who have been engaged in every disturbance, and who are now groaning under an infurrection act, attended with enormous expense, which the usual parliamentary opponents of government could not object to, and which, though there is an apparent calm, it would be yet unsafe to repeal. The increase of tillage would operate favourably, but the exemption of grazing land from every kind of tithe, operates as an encouragement to it, which the present state of the market for grain is not likely to counteract. Whilst, however, Tipperary contains a considerable portion of very fertile land, it has also extensive tracts of bog and mountain. Of the former, the most extensive is a tract lying in the north-east of the county, between the towns of Roscrea, Templemore, Limerford, Littleton, and New Birmingham, and forming a part of the Great Bog of Allen. This was surveyed by Mr. Ather, of Castle-comer, under the directions of the commissioners for enquiring into the nature, extent, &c. of the bogs of Ireland; and from his report it would appear, that about 36,000 acres, mostly in this county, might be safely reclaimed, and at a moderate expense, on account of the favourable situation for draining, and the abundance of limestone gravel, of which the district is principally composed, and which is the best material for reclaiming them. To the south of this range of bog, and situated between the small town of Killenaule and the county of Kilkenny, is the coal district. It resembles what has been called the Leinster coal district in the very able geological and mining report lately given of that district by Richard Griffith, efq., mining engineer to the Dublin Society. It seems indeed to be only a continuation of that district, and is separated from it by a secondary limestone country. The species of coal is the carbonaceous or stone-coal, better known by the name of Kilkenny coal. To the south of this, and in the south-eastern angle of the county, is Sliebh-na-man mountain. On the borders of the county of Waterford, over the town of Cloghen, are the Knockmeal-down mountains, which occupy a considerable space in both counties. Nearly parallel to these, and north of them, are the lofty Galtees, extending from the borders of Cork and Limerick to the town of Caher. Between these and the town of Tipperary is the lower range, called Sliebh-na-muck; but the greatest extent of mountain crosses the county from south-west to north-east, running from the county of Limerick to the Queen's county, and completely separating the two Ormonde from the rest of the county. The high hills adjoining Limerick are called the Keppe mountains, from the highest of them, which is a remarkable object to the traveller and the adjoining country. The hills near the small town of Silvermines, have been marked in some maps as the Silvermines mountains; others have been called the Devil's Bit; and adjoining the Queen's county, they take the name of the Sliebh-bloom mountains. In this district, lead and copper mines have been wrought with various success; and some parts of it afford fine mill-races. The river Suir rises in the north of the county, near Roscrea, and flows from north to south, when it takes an easterly direction, and becomes the boundary between it and Waterford. This and its tributary streams afford an abundant supply of water, and turn a very great number of boulting-mills. The western division of the county has the Shannon for its boundary, and is well watered by the streams which flow to it from the range of mountains above mentioned. Clonmel, on the Suir, and at the southern extremity of the county, is the thre-town, and though very inconveniently situated for the affizes, has an excellent gaol, court-house, &c. It is a place of considerable trade, and one of the principal inland towns of Ireland. Cashel, Roscrea, Nenagh, Tipperary, Carrick, and some others mentioned in their proper places, are of respectable size, but none of them distinguished for trade or manufactures, unless we except the manufactory of ratteens.
Tipperary was, previous to the arrival of the English, a part of the kingdom of Munster; sometimes separated as an independent soverignty under the kings or princes of Cashel. The name Ormond is a corruption of Oir Momond, i.e. East Munster, and was so called in opposition to Desmond, South Munster, and Thomond, North Munster. After the English settlement, the O'Brien's were confined to Thomond, the Fitzgeralds established themselves in Desmond, and the Butlers became the possessors of Ormond and Kilkenny, acknowledging indeed the sovereignty of England, but maintaining such authority as rendered it only nominal. The counties of Kilkenny and Tipperary were palatinate; and it was not till the attainer of the duke of Ormond, in 1716, that this distinct jurisdiction was abolished. As the inhabitants of Tipperary were actively engaged against the Protestants in 1641 and the succeeding years, great fortifications took place on Cromwell's successes, and many of the present landholders are descendants from his officers. Tipperary abounds with ruins. The number of old castles is very great, some of them boldly situated, and forming very striking objects to the traveller: such as the castle of Ardbranant, built by king John, and that of Cabier, on an island in the Suir. The chief ecclesiastical ruins are those of Holycrofs, Monaincha, and Cashel, which all deserve to be visited by the curious. No authentic account has been published of the county of Tipperary, and there appear to be very scanty materials for its history.

Tipperary, a market and port-town in the county of the same name, 87 miles S.W. from Dublin, and about 20 miles N.W. from Clonmel, on the road to Limerick. Its name is said to be in Irish Tiobrad-arain, signifying the well of the territory called Arain. The town is not large, and appears to be in a ruined condition, though it was formerly of sufficient importance to give its name to the county. The adjoining country is very rich, and there are some fine feats, especially Thomlawn, the splendid feat of the earl of Llandaff, defended from the Mr. Matthew whom Swift visited; and Damers-Court, a feat of the earl of Dorchester. In the neighbourhood are the ruins of Emly, the church of which was once the metropolitan church of Munster, and which still gives name to a bishoppical see of Cashel.

Tipul. See Tipula.

TIPREE, a dry meature at Bombay; where the candy contains 8 parshes, the parsh 16 adowles, 64 feers, or 128 tippees. Rice is sold by the batty measure, in which the morah = 4 candies, or 25 parshes, the parsh 20 adowles, 150 feers, or 300 tippees. A candy is = 25 Winchefter bufheles nearly.

Tipsa, in Geography, a town of Algiers, in the province of Constantia, on the borders of Tunis, near the banks of the Melagge, anciently called Tipaza; at present a frontier city and garrison of the Algerines. This place, which enjoys a fine situation, with some mountains at a small distance, Rill preserves the principal gate, several fragments of old walls, and other marks of the rank and figure it formerly obtained among the cities of Numidia; 85 miles S.E. of Constantia. N. lat. 35° 27'. E. long. 8°.

TIPSTAVES, officers appointed by the marshal of the king's bench, to attend the judges with a rod or staff tipped with silver, and take charge of such prisoners as are either committed, or turned over at the judge's chambers.

The denomination is also sometimes given to those more frequently called bodons; who are the wardens of the fleet's officers, attending the king's court with a painted staff, for the taking into custody such prisoners as are committed by the court; and to attend such prisoners as go at large by licence.

Tipul, in Natural History, a name given by the people of the Philippine islands, to a species of crane common there, and so tall, that when it flands erect, it can look over a man's head. See Dongo.

Tipula, in Entomology, a genus of the Diptera order of insects, the characters of which are, that the mouth has a short proboscis, membranaceous, canaliculated on the back, receiving a bristle; the haustellum short, without a vagina; the feelers two, incurved, equal, filiform, longer than the head; the antennæ are mossily filiform.

The smaller species of this genus so much resemble gnats, that the generality of authors, not excepting even Goedart and Swammerdam, have confound the two genera, and described these among the gnats.

The long form of the body, the position of the wings, and the length and position of the legs, are the circumstances that make the resemblance between the gnats and tipula; but the structure and organs of the head are alone a very sufficient distinction.

As the tipula differ from the gnats in the figure of the mouth, and in being without a trunk, they differ as much from the other flies of that character, by resembling the gnat in the shape of their body. They differ also in the conformation of the mouth, and its several parts and organs. The opening of the mouth is a slit extending itself from the fore part of the head toward the hinder part, and its lips cannot be called upper and lower; but they are lateral ones. When the body of the creature is pressed, this mouth opens, and shews what seem to be a second pair of lips within. These are more firmly closed than the others, and resemble only certain duplications of the floor. The exterior lips are cartilaginous, and are furnished with short hairs; the interior are perfectly smooth, and of a fleshy texture. The head of the tipula is of a long and slender figure; the lips are articulated at the extremity of this head, and on each side there stands, on the upper part, a fort of beard, which, when minutely examined, is found to be articulated in the manner of the antennæ of insects. These two beards, in their usual position, are placed close together, and bent forwards over the head; their office seems to be the covering of the aperture of the mouth. These seem constantly to be found in all species of the tipula, and placed exactly in the same manner.

The largest species of tipulae are usually found in our meadows, and those are in no danger of being confounded with the gnat kind, their size alone being a sufficient obvious distinction. These are often found of nearly an inch in length from head to tail; but their bodies are very slender, and are composed of only nine rings. The male tipula is easily distinguished, at sight, from the female; it is much shorter in the body, and is thicker at the tail than any where else; this tail usually turns upwards, whereas that of the female is placed in the same line with the body, and is slender, and composed of several fealy parts, proceeding from the last ring of the body. These creatures are found in our meadows through the whole summer; but the end of September and beginning of October is the time when they are most of all plentiful.

The legs of these creatures are greatly disproportioned to the body, according to the common rules of nature, especially the hinder pair, which are in the larger species usually three times the length of the body.

This large species is a creature of no great beauty; its body is of a brownish colour, and its corcel is so elevated, that the creature seems hump-backed; the head is small, and
the neck very short; the reticulated eyes are so large, that they cover almost the whole surface of the head; these are of a greenish colour, with a cast of purple, when viewed in some lights. Reaumur supposes that two very lucid specks, on the anterior part of the breast, are eyes, though placed in so very singular a manner; the wings of this creature are long, but very narrow, and seem fearfully well proportioned to the size of the animal; they are transparent, but have a flight call of brown; and their ribs, when viewed by the microscope, appear beft with scales, or feathers, in the manner of those of the great kind. Some species of the tipula have them also fringed with these scales at the edges; there are no ailerous, or petty wings, at the origin of these, but in the place of them are two very fine balancers or mallets; these have long pedicles, and roundish or oval heads; the frigmenta of the corselet are four; one pair is placed immediately underneath these balancers, and the other immediately below the first pair of legs; the first pair is very long, the others small, and those on the rings of the body, if there be any, are too small for our flight, even with good glasses. Each ring of the body is compoied of two half cylinders, which are joined into one, by means of a membrance, which gives them room to digest or close up at the creature’s pleasure. The large tipula all carry two anten- nas, or horns, upon their heads; but these are of no remark- able structure, they are only compoied of a great number of joints, each covered with a fine downy hairiness; and at the joining of each to the next, there is a tuft of longer and more stiff hairs. This is the description of the common large tipula which we find in the meadows, and in almost all its parts is applicable to the generality of the larger species of these insects.

The smaller kinds are very numerous, and of great variety. These are frequent in all places, and at all seasons of the year; the spring shews us immense clouds of them, and even the coldest winter’s day shews a great number of them in the sun-shine about noon. These creatures fly much better than the larger tipula; they seem indeed to be almost continually upon the wing, and their manner of flight is very singular; they are continually mounting and descending again, and that without quitting the direction of the line in which they go forward; this they will often do for many hours together. In tracing these flies from their origin, they are all found to be produced from worms which have no legs, and have a regular faly head. Thofe from which the larger tipula are pro- duced live under ground; they are molt fond of marshy places, but any ground will do that is not often disturbed. They usually are found about an inch under the surface, and are fo plentiful in some places as greatly to injure the herbage.

These creatures do not find it necessary to their living, that plants should be upon the surface of the earth in which they live. There is frequently found in the hollows of the trunks of old trees, a fort of earth which seldom produces any vegetables; yet the female flies of this species well know that their young will find a proper habitation there; and there are usually found great numbers of them in all these places. The hollow elm and willow, fo common in our hedges, and by ditch sides, afford innumerable proofs of this; but it must be observed, that they are only found in such earth of this kind as is continually somewhat moist.

M. Reaumur mentions a very singular species of large tipula, which was produced with him from one of the worms found in the earth of an old elm; this was of the larger kind, and had some beautiful spots on the wings. It had also a very elegant tufted antenna; whereas, in the common large tipula, these are plain and simply granulated ones, as well in the males as females. Reaumur’s Hist. Inf. vol. ix. p. 7, &c.

The numerous species are distributed, by Gmelin, into several classes, as follow:

*With patent Wings.*

**PECTINICORNIS.** With pectinated antennæ; the wings with a black spot; the thorax yellowish. Found in moist places in Europe.

**RIVOSA.** With hyaline wings; rivules brown, with a snowy spot. Frequent in Europe.

**Sinuata.** With white wings, fringed margin and spots brown; cinereous body, and ferruginous feet. Found in the north of Europe.

**Quadrimaculata.** With wings brown-veiny, margin and four spots brown; abdomen above yellowish. There is a variety denominated *calmarinella.* Found in the meadows of Europe.

**Crocata.** With wings having a brown spot; abdomen black, yellow bands. Frequent in the north of Europe.

**Oleracea.** With hyaline wings; the margin of the rib brown. Found in Europe at the roots of pot-herbs, grain, &c. &c.

**Hortorum.** With hyaline wings; scattered obfolute spots. Found among the pot-herb plants of Europe.

**Tricolor.** With white wings; the exterior margin and bilid apex brown. Found in North America.

**Triangularis.** With wings dimidiate-brown, and white triangular spot. Found in Scotland.

**Variegata.** Black; base and sides of the abdomen red, spotted with yellow. Found in the gardens of Europe.

**Contaminata.** Black, with white wings; two bands, and a point black. Found in moist places of Europe.

**Lunata.** With ash-coloured wings, and white marginal lunule. Found in the meadows of Europe.

**Turcica.** With veiny wings; white marginal lunule; cinereous body, and abdomen with a black dorsal line.

**Pratensis.** With variegated thorax; brown abdomen; sides spotted with yellow; front tawny. Found in the meadows of Europe, destroying the roots of grasses.

**Dorsalis.** Yellowish; brown back; hyaline wings; marginal spot black. Found in Germany and Italy.

**Plumea.** Brown-cinereous, with white wings; rib and nerves black. An Italian insect.

**Terestris.** With hyaline wings; brown marginal point; back of the abdomen cinereous. Found in Europe. See *Crane-Fly.*

**Corymbica.** With hyaline wings, marginal point brown; abdomen yellow; three lines brown. Found in Europe at the roots of plants.

**Nigra.** With brown wings, and black body. Found among the plants of Europe.

**Albimana.** Black, with teltaceous thighs, and hinder tarsi white.

**Costalis.** Sordidly yellow; with antennae twice longer than the body; hyaline wings, and brownish coila. Found in Van Diemen’s Land.

**Clavipes.** Brown; with tarsi annulated with white in the middle; ovate, inerinfated. Found in North America.

**Atrata.** With glaucescent wings; marginal point and body black; first segment of the abdomen and feet red. An European insect.

**Bimaculata.** With hyaline wings; two brown spots; the middle of the abdomen spotted ferruginous; plumose ante- nnae; as the former.
**TIPULA.**

**ANNULATA.** With wings variegated with brown; thighs with white rings; as the former.

**OCELLARIS.** With whitish wings, very numerous, blackish, ocellar spots. North of Europe.

**CINEREA.** With whitish wings, three brown spots, cinereous unpotted body. A Norwegian insect.

**FASCIATA.** With whitish wings, four brown flexuose bands; abdomen and feet yellowish. Found in the marshes of Sweden.

**MELANOCYPHALA.** Telfaceous; head and dorsal line of the thorax black; wings hyaline; three brown streaks. A Cayenne insect.

**SEXPECTATA.** With white wings; three marginal brown points; thorax compressed, yellow; dorsal line black. Found in Italy.

**FLAVIPES.** Brown, with obscure wings spotted cinereous, and three brown costal spots; feet yellowish; joints brown.

**TRIPOUNDATA.** With hyaline wings; three marginal brown points; yellow body. Found in Italy.

**FLAVEOENSIS.** With unpotted yellow body; brown back. Found in the fields of Europe.

**ENSIFORMIS.** With lanceolate ferrulate antennae; wings, veins, and spot black. Found in Sweden.

**REGULATIONIS.** With hyaline gloppy wings; cinereous brown body. Found frequently in Europe.

**PILOPI.** Cinereous; with frilled brownish wings; fore-moll legs hairy.

**MOLIO.** Black; with white wings; marginal point brown; pallid feet.

**REPLICATA.** With hyaline wings; margin flinder, recurved; body brown; simple antenne. Found in the waters of the north of Europe.

**MONOPTERA.** Black; with feet and pedes pallid. North of Europe.

**ARUNDINETI.** Whitish; villiform antenne; black eyes. Found among the reeds of Europe.

**BARRACORNIS.** Black; with plumose antenne; simple at the apex. Found occasionally in Europe.

**GIGANTEA.** With wings brown, hyaline, waved longitudinally in the middle. Found in the gardens of Austria and France.

**VESOSA.** With hyaline wings; veins brown, and brown margin. In Upper Austria.

**PLICATA.** Cinereous; with hyaline wings; brown veins; external margin and middle line interwoven in small folds. In Upper Austria.

**PUNCTATA.** With hyaline wings, pointed with black; external margin spotted with black. As the former.

**PHAGONITIDIS.** Yellow; with black head, hyaline wings, and three black points. Found among the reeds in Austria.

**LINEATA.** Yellow; pointed with three lines on the thorax, and four on the abdomen. Austria and Carniola.

**OCREATA.** Black; with hyaline wings, spotted and pointed with black; the band before the hinder tarsi white. Upper Austria.

**BIFASCIATA.** Yellow; with hyaline wings, subfuscicicat with brown. Upper Austria.

**DEPRESSA.** With cinereous thorax; abdomen yellow, depressed; wings yellowish-brown; four marginal spots brown. An European insect.

**DISCOLOR.** Cinereous; abdomen on both sides yellowish; wings with brown and white spot. As the former.

**PELOCINATA.** Black; with antennae semi-pectinated; glaucous wings; marginal point and apex large; thighs and legs red; apices black. As before.

**VERSICOLOR.** Yellow; thorax yellow, spotted with black; abdomen and back, beneath and sides, cinereous; wings, veins, and spot brown. As before.

**MACULATA.** Black; bill, legs, and apex of abdomen yellowish; wings with scattered brown spots. As before.

**LUTEA.** Pale yellow; with yellowish wings. As before.

**FUSCA.** Black; with two yellowish bands on the abdomen; white wings, spotted with black; yellowish legs, joints, and foiles; with the toes brown. As before.

**QUADRIFASCIATA.** Cinereous-yellowish; with grey wings; four yellowish bands, and margin of coila pointed; with yellow legs; black joints. As before.

**OCTOPUNCTATA.** With white wings; eight black points; black abdomen; thorax and legs pale. Found at Paris.

**PARISIENSIS.** Green; with hyaline wings; brown band; the two bands of the abdomen and anus black. As before.

**SECOALIS.** Cinereous; with ciliated wings; eyes, antennae annulated with white; the apex of the abdomen and feet black. Found in fields of rye. Gmelin queries whether the two last species belong to this tribe of insects.

* With incumbent Wings: "Culiciform."

**PLUMOSA.** With greenish thorax; white wings; brown point; and plumose antennae. In the marshes of Europe.

**LITTORALIS.** Greenish; with unpotted wings; and fore-legs very long. In the maritime parts of Europe.

**CINCA.** Livid; with wings and three marginal spots black; the abdomen black, annulated with white. Found in Sweden.

**MOTITRACTRIX.** With fore-legs very large and motatory; with white ring. Frequent in Europe, yellow-green.

**PILOCORNIS.** Blackish; fore-legs as before; thorax lined; white wings unpotted.

**FASCIULATA.** Black; fore-legs as before; sides of the abdomen spotted with ferruginous. Found in Germany.

**TENVENS.** Ferruginous; with white unpotted wings; fore-legs very long and pale. In marshes of Denmark.

**VIBRATORIA.** Fore-legs very large, motatory; white at the apex. Found in marshes of Europe.

**VARIA.** Brown; fore-legs elongated; abdomen yellowish; wings variegated with white and black.

**TREMULA.** Fore-legs very long, motatory; black, with white wings. In the marshes of Sweden.

**FLEXILIS.** Fore-legs motatory, all pallid; wings with duskyish band. In the watery places of Europe.

**MOLISSIS.** With white legs, nine black rings; wings varied with white and cinereous. In the gardens of Europe.

**ZONATA.** Pallid; with wings, two bands, and three points brown; thighs with brown angle. Found in Orford.

**VIRENS.** Green; with unpotted wings; brown foils. A Swedish insect.

**VIRIDULA.** Green; with antennae verticillate, hairy; pallid legs. North of Europe.

**GENICULATA.** Beneath yellowish; lines of the thorax and back of the abdomen black, with white immaculate wings.

**PALLIDES.** Smooth-brown; with hyaline unpotted wings, and pallid legs.

**MACROCEPHALA.** Greenish; with eyes and back of the thorax black. In the marshes and moil shores of Europe.

**PUSILLA.** Green; with three black spots on the hinder
part of the thorax; antennae of the male plumose. In the
ixes of Europe.

MARG. Black, smooth; with blackish wings; fore
thighs furrowed inwards. In the dunghills and potter
ole of Europe: probably a variety of hortulana?

THOMAS. Black, smooth; with black wings; sides of
the abdomen marked with a saffron line. At Upfal.

CHRYSANTHEM. Black, smooth; the abdomen red at
the base; the antenna incrassated, pilose. On the crysan-
themus coronarius of Spain.

FERRUGIATA. Black, smooth; brown wings; abdomen
brown-ferruginous. South of Europe.

JOHNANNIS. Black, smooth; white wings; black point;
short antenna; black legs. In shady parts of Europe.

POMONE. Black, smooth; hyaline wings; black point;
ferruginous thighs. In the plains of England and
Norway.

RUFOCULLIS. Black, smooth; red thorax. At the
Cape of Good Hope.

BREVICORNIS. Black, smooth; with wings blackish at
the margin; abdomen brown; fore-arms spinose. In the
shady gardens of Europe.

PUTERIS. Brown; the base of the wings cinereous. In
the tending soil at the commencement of spring.

FERRIS. Black, obovate, hairy; with blackish wings.
An European insect in clofe places.

INSULARIS. Black, hairy; with ferruginous legs, hinder
elongated.

FORCIPATA. With cylindrical black abdomen; wings
brown-thaline; anus appendicularte. An English insect.

VERNANS. Cinereous; thorax black-lienated; white
wings spotted with brown. In meadows of Denmark.

FLORILEGA. Black, fikken. On the apple-flowers of
Europe, which it destroys.

HORTELANA. With hyaline wings; exterior margin
black. In the flowers of alparragus and apple.

PHALENOIDES. With wings deflexed, cinereous, ovate-
laneculated, ciliated. In the walls of dunghills and mixens
of Europe.

HIRTA. Hairy; with wings deflexed, ovate-ciliated,
telfellated with white and black. In Lapland.

PERSICARIA. Black; with wings incumbent, subic-
ulated; under the leaves of the peach-tree.

NOTATA. Black; with white wings; with a white spot
in front of the sides of the abdomen. In Europe.

JUNIPERINUS. Cinereous; with white wings; margin
villosa; found in the juniper.

CUOCIFORMIS. Cinereous, with pallic legs; wings
marked with two blackish spots. At Upfal.

INCARNATA. Incarnate; with moderate antennse. At
Upfal.

PALUSTRIS. Pallid; black head; reddish abdomen. In
marshes of Europe.

LONGICORNIS. With antennae longer than the incarnate
body. In most places of Europe.

RUPICERES. Black; with red legs; wings black in the
middle; yellowish at the base. North of Europe.

STICTICA. Black; segments of the abdomen white at
the apex; wings with a brown point. In Germany.

PALLIDA. Pallid, pilose; legs punctated with black.
In Germany.

HAFNIENSIS. Brown; lateral line of the thorax and
legs white, unpotted.

FLABELLICORNIS. Pallid; abdomen annulated with
black; wings spotted. Germany.

BIPUNCTATA. Brown; wings cinereous; marginal
point white. Found in Europe.
learning as astonished his readers; but the public in general was still more astonished at his finishing the whole work in eleven years, consisting of thirteen large volumes in 4to.; a work which, by its immense erudition, profound critical disquisitions, and judgment in every kind of literature, acquired him the praise of the whole republic of letters.

Besides this great work, he published during the same period the life of St. Olympia; a letter on the comparative excellence of Italian and Spanish literature; the life of Fulvio Testo; the two first volumes of the Biblioteca Modenese; and all the articles which he furnished to the twenty-three first volumes of the Giornale di Modena, a kind of review and history of new books and discoveries in arts and sciences within the year.

He was knighted by the duke of Modena, though a regular ecclesiastic, and ennobled by his fellow-citizens at Bergamo. To enable him to proceed in his great work with more convenience, his patron augmented his appointment, and gave him an assistant in the library.

His correspondence with the learned throughout Europe must have occupied much of his time; as at his decease, among his papers were found materials for twenty-eight volumes of original letters addressed to him as author of the Literary History of Italy, and editor of the Giornale di Modena. In his numerous works, as well as in those of greater volume and importance, he discovers himself to have been gifted with a quick penetration, and possessed of great facility in writing, as well as a clear conception of the works of others, which to have acquired, must have been studied with constant application.

This admirable writer died at the age of sixty-two, of a bloody flux, in 1794.

From this celebrated work, we expected to acquire new and authentic information concerning the rise and progress of music previous to the seventeenth century, in a country which has taught every other part of Europe all the refinements of the art, a country which we fought in vain, by travelling, conversation, and the perusal of all the books written by the natives which we could procure on the subject, to trace the origin of Italian melody. Dull and pedantic elementary books we procured in abundance; but scarcely any that we could read with pleasure, previous to the establishment of the opera at the beginning of the seventeenth century. Quadri's heavy volumes are filled without taste, feeble, or feeble-minded concerning the authenticity of facts. Padre Martini, unfortunately for modern musical history, did not live to finish his plan; having advanced no farther than the ancient music of the Greeks.

Tiraboschi is copious on all other parts of literature, arts, and sciences. It is only on music, and musical writers, our peculiar research, that we have ever found him unfavourable: we never consulted him on any other subject unprofitably. The little he tells us of Pythagoras, Arithoxenus, the Etruscans, and Guido, we had often previously read in innumerable books in various languages.

He speaks of the Lyric poetry of the Greeks and Romans; but that of the Italians has not furnished an article. We did hope to be informed what kind of melodies were set to the songs of Dante, Petrarch, and Boccaccio. We could not reasonably expect specimens of this melody in notation, any more than prints of pictures and buildings that are mentioned in his work; but when a capital work of Raphael, Michael Angelo, or Palladio is mentioned, we are generally told where it is to be seen, or at least where it has been seen. Had Tiraboschi told his readers where the original melodies to the songs of the old Italian poets were to be found, it would have been a great satisfaction to those who consult books for useful and solid information, or seek in them for any thing but mere amusement.

Of the latter century he says nothing, as his plan went no farther than the end of the seventeenth century. And, indeed, of that period, his information is very scanty; neither Carulli nor Stradella, the two best composers which Italy had then produced; nor among contemporary theorists, or writers on harmonics, is any notice taken of Lemme Rossi, or Daniel Bartoli, authors of two books, which in a general history of literature ought to have been mentioned. See Bartoli, and Rossi.

TIRACHEA, in Ancient Geography, a town of Judea, in the Decapolis, on the coast of the sea of Galilee.

TIRADE, in French Music, formerly implied what the Greeks meant by ἀγωγή, ἀγωγα, ἀδιάτικος, the filling up a wide interval by the intermediate diatonic notes. (See GREEK MUSIC.) But, at present, tirade seems nearly equivalent to velocitas in Italian; a division, a flight.

TIRAGHT, in Geography, an island in the Atlantic, near the W. coast of Ireland; 8 miles S.W. of Dunmore-Head.

TIRAMANGALUM, a town of Hindoostan, in Madura; 10 miles S.W. of Madura.

TIRAMANY-MUTTOO, a river of Hindoostan, which runs into the Caunvery; 8 miles N. of Carroor.

TIRAN. See TYRAN.

TIRANADUM, or TIRINADUM, in Ancient Geography, a town of Africa, in Mauritania Caesarea, on the route from Carthage to Caesarea, between Rapidum and Caput-Ciillanum. Anton. Itin.

TIRANDURG, in Geography, a town of Hindoostan, in Myfors; 12 miles S.S.E. of Orifoor.

TIRANO, a town of Italy, in the department of the Lano, late belonging to the Grifons, the capital of the Upper Terzero, and residence of a governor called Podela, on the Adda, which divides it into two parts, connected by a stone bridge of a single arch: formerly surrounded with walls by Ludovico Sforza, as a defence against the Grifons, who destroyed the fortifications when they gained possession of the Valtelina. The chief trade is in wine and silk, which is not confiderable. The wine is sent into the country of the Grifons, to Bormio, and into the territories of Venice; the silk, which is drawn from this district of the Valtelina, is not of the best quality, nor very abundant; part is forwarded to Venice, and the remainder, through Chiavenna, to Germany. About half a mile from the town, on the other side of the Adda, is the church of the Madonna, or Virgin, much visited by Catholic pilgrims; the modern buildings annexed to what remains of the old edifice is in an elegant style of architecture, and the era of it is 1533, the ancient part having been erected in 1266. In the area before the church is held the fair of Tirano, remarkable for the number of cattle brought hither for sale; they are fed upon the highest Alps, where they continue until the snow begins to fall, and are chiefly sent from hence into Italy. The fair is in October, and lasts three days, during which time the authority of the podela is suspended, and the governor of the Valtelina has absolute jurisdiction over the town and the district; 44 miles E.N.E. of Morbegno.

TIRANY, a town of Hindoostan, in the Carnatic; 3 miles N. of Ootatore.

TIRATA, in old Italian Music, implied a regular accent or defect of notes of the same kind; but, at present, the term has a more extensive acceptation than its original import, drawn out: as when a subject is well treated, producive
The TIR

ductive of beautiful paffages, made the molt of by a com-
poler; it is thain said to be ben tirato.
TIRBIA, in Geography, a town of Spain, in Catalo-}
nia; 16 miles N.W. of Urgel.
TIRE, or, as the leamen pronounce it, tier of guns.
See Tire.
TIREBOLI, in Geography, a river of Turkish Arme-
nia, which runs into the Black sea at Tireboli.—Also, a
town of Turkish Armenia, on the Black sea, at the mouth
of a river of the same name; 20 miles N.E. of Kerfour.
TIREH, a town of Abijat Turkey, in Natolia, sitiuated
on the Meimder; the inhabitants are chiefly Turks: 32
miles N.E. of Smyrna. N. lat. 38° 8'. E. long. 27° 46'.
TIRES of Wheels, in Rural Economy, the straps, flaps,
bands, or hoops of iron which are put round them for the
purpose of guarding and protecting them against the ef-
ects of the roads, as well as securing and keeping them tight in
their different parts. The most advantageous and benefic-}
ental form of tire for wheels of different kinds and breadths in
different points of view, have probably not yet been well af-
certained. It is obvious, however, that it should be such as
may have the least possible tendency to penetrate and de-
stroy the surfaces on which the wheels act and move. It
would appear, that almost all of those who have written on
this subject, have gone upon a wrong or false principle;
early all having directed that the exterior fence, when
more bands than one are used, as in the case of broad-wheeled waggons, should be unequal; in such a man-
er as that the centre band may receive the whole of the
preasure, when the road is even and composed of hard ma-
terials; the other bands being only in readiness to fulfill
their portions of the burden, when, either from unevennesses
or the want of firmness in it, they may be brought into
contact with it.
It is well known, however, to every one, that it is the
nature of a wedge to work its way, when forcibly applied
to a cleft or opening; and that the extent of its penetration
will depend on the sharpness or acuteness of its wedge-
form, and the power by which it is impelled. Admitting
this to be the fact, it is plain that every wheel, the tire of
which acts in the smallest degree as a wedge, must enter a
loose foil, surface, or road, more or less, in proportion as its
edge or projection is more or less acute and protruding,
or the contrary.
A rolling cylinder is not easily capable of penetrating
below the surface, for this reason, that it presents no one
protruding point; but where a rolling body swells out in a
projecting manner in the middle, it will unquestionably act
or work deeper in that part where it is the most promi-
ent, than in any other, as it is a sort of obtuse wedge.
And such must be the case in every wheel of which the
tire is not cylindrical; as when its protruding part gets in,
the whole body soon finds its way.
A broad flat tire is not, however, without its inconve-
nience; as, whether the road be good or bad, it presents
the same surface, and, of course, is as much refisted in its
front, while on a hard surface, as while on one into which it
sinks. Consequently, the cylindrical tire can never draw
light and free, though it will not by any means penetrate
deeply into any tolerably sound surface.
Flat tires are probably, however, the belt of any for
narrow wheels.
In consequence of the above, it has been proposed by
some, that every wheel should be furnished with a concave
or hollow tire which is cylindrical; but, that, after leaving
two rims, of proportionate breadth, at the edges, the whole
intermediate space should be scooped out, or otherwise hol-
lowed. By this means, on hard roads, the wheel would
ride on the two rims only; while on soft roads, the whole
would bear up the burden. All such wheels, the tires of
which have even the smallest tendency to a wedge-like
form, invariably, it is said, throw the foil or earth from
them; squeezing it out at the sides, and burying them-
selves, not only in the furrows they make, but under the
very mud which they force from out of them; while, on the
contrary, the concave tire, it is supposed, keeps in the
soft soil, until, indeed, it be in an absolutely floppy flat,
and forces it, by compulsion, to bear up the weight or
burthen. It is observed, that let two wheels be tried on a
meadow which is not very firm in its surface, the cylin-
drical tired wheel will, affixed, act better than that with a
receding or convex edged fort of tire; but that the con-
cave tired wheel could not, it is believed, fail to disply
its superiority in several of the most defirable points and
respects.
Let it be supposed that the tire of a waggon-wheel is
nine inches in breadth, and cylindrical: at the two edges
leave a band of one inch in breadth, or more; then groove
out the intermediate space, to an inch and a half in depth
in the centre, rounding it in gradually. Such a tired wheel
would, it is said, on a hard road, present only two inches of
bearing; while the refusal would gradually increase in propor-
tion as the incumbent weight, and the loofness of the surface over which it may be proceeding,
should bring the whole to bear in an equal manner.
The soft foil could not escape so easily, at least, it is conceived,
from under a concave tire, as those of the opposite kind,
consequently it could not add to the exterior impediments of
wheels.
It must nevertheless be admitted, it is said, that the con-
cave tire is liable to some disadvantage; for instance, it will
at times clog, and, possibly, not only choke its own groove,
but even accumulate considerably more; which will adhere
to the clay and other matters with which the groove may be
filled. In this way, it would, in fact, it is thought, be-
come, in a certain measure, cylindrical. But that if it did
no more than fill its groove on heavy soils, it would not
prove so highly objectionable; for, on such, the whole
breadth of the tire ought to press the foil or surface.
The remedy suggested for the above inconvenience, in
such cases, is that of a suitable fixed speror, which has no
difficulty in it, at least, for carriages on one pair of wheels,
or for the hind wheels of waggons. Such a speror, and the
mode of fixing it in such cases, may be seen described in
speaking of sperors for different kinds of implements,
tools, &c.
These hints and suggestions may be useful in leading to
farther improvements on the tires of wheels, which is a
matter of great importance in different points of view, and
which, as has been seen, has yet been thought but little
upon in a proper manner. See Wheel.
TIREMEG LAKE, in Geography, a lake of North
America. N. lat. 61° 52'. W. long. 107°.
TIRGUBIS, or TIGUMI, in Ancient Geography, a town
of Afla, in Mefopotamia, on the banks of the river Chas-
boras, according to the Theodosian table and Ptolemy;
fituated N.W. of Refana.
TIRGUL, in Geography, a town of European Turkey,
in Moldavia; 62 miles W. of Jaffy.
TIRGULFORMOSA, a town of European Turkey,
in Moldavia; 20 miles W. of Jaffy.
TIRING,
TIRING, in Falconry, is the giving a hawk the leg or pinion of a fowl to pluck at. Dic. Ruft.

TIRIPANGADA, in Ancient Geography, a town of India, on the north side of the Ganges. Ptol.

TIRIPIN, in Geography, a sea-port of South America, in the province of Cumana.

TIRISTA, in Ancient Geography, a town of Lower Myfia, near the Danube, between Trirnanium and Duruf- torum. Ptol.

TIRISTRIA, or Tetria, a promontory of Lower Myfia, on the Euxine sea, between Dionylopolis and Odus-thus. Ptol.

TIRKA, in Geography, a town of Africa, in the kingdom of Ghana, on the north side of the Niger; 120 miles E. of Ghana. N. lat. 3° 26'. E. long. 14° 30'.

TIRLEMTON, a town of France, in the department of the Dyle, called by the people of the country Toren; on the Geete. It was anciently one of the principal cities of Brabant, and made a fourth quarter in the assembly of the States; but that precedence was afterwards removed to Bois-le-Duc. It certainly has been a very flourishing and populous city, and many vestiges of its grandeur are yet visible; but it has suffered much by war, and other calamities; 9 miles S.E. of Louvaine.

TIRMAKUL, a fort of Hindooflan, near Gooty, taken by the British in 1801.

TIRMANIZ, a mountain extending from Bukovina to Transylvania.

TIRNA, a river of Hungary, which runs into the Danube, a few miles below Presburg.

TIRNAU, a town of Hungary, containing nine churches, and as many convents. This town was built in the thirteenth century; 20 miles E.N.E. of Presburg. N. lat. 48° 31'. E. long. 19° 44'.

TIRIAN, See TARBON.

TIROCOOR, a town of Hindooflan, in Golconda; 8 miles S. of Calloor.

TIRRETO, a town of Naples, in Calabria Ultra; 15 miles E.S.E. of Reggio.

TIRROUP-MEW, a town of the Birman empire; the meaning of the word is the Chinefe land, and the appellation was derived from a victory obtained over the Chinefe some centuries ago, when they invaded Birmah; 35 miles N.E. of Pegu.

TIRSA, in Ancient Geography, a town of Macedonia, in Mygodia.

TIRSCHNIED, in Geography, a town of Bavaria; 28 miles N.N.E. of Amberg.

TIRSCHNITZ, a town of Bohemia, in the circle of Kauzim; 4 miles N.W. of Kottetsz.

TIRISO, in Ethnology, a name given by Gaza and some other authors to the placeana of Willughby and others, the parge or marjum. Phyll, Bellonius, and many others call it turjof.

TIRSRUM, in Geography, a town of Sweden, in Earl Gotland; 25 miles S. of Linkoping.

TIRUA, a small island in the Pacific ocean, near the coast of Chili. N. lat. 35° 30'.

TIRUAN, a town of Hindooflan, in Bundeucund; 20 miles N.E. of Callinger.

TIRUMBORE, a town of Hindooflan, in Madura; 7 miles N.E. of Madura.

TIRUN, or TEBRONE, a name given to tribes who live chiefly on the N.E. coast of Borneo, and are reckoned a savage and piratical race, addicted to eating the flesh of their enemies. Their language is peculiar. It is probable, however, that they are only a tribe of Idan, who are imagined to be only a race of Harafors or Alfeors, as they are termed by the Dutch, who seem to be the most original race of all the eastern islands, excepting perhaps the Papuas. The Idan are sometimes termed Marit; they are certainly the original inhabitants of Borneo, and resemble the Harafors usually in stature, agility, colour, and manners. The Harafors are indigenous in almost all the eastern isles, and are sometimes found on the same island with the Papuas or oriental negroes. They are often lighter in colour than the Mahometan races, and generally excel them in strength and activity. They are universally rude and uncalled, and where they have not been reduced to the state of slaves of the soil, their manners have a general resemblance. In their manners, the most singular feature is the necessity imposed on every perfon, of some time in his life embracing his hands in human blood; and, in general, among all their tribes, as well as the Idan, no person is permitted to marry, till he can show the skull of a man whom he has slain. They eat the flesh of their enemies, like the Battas, and drink out of their skulls; and the ornaments of their houses are human skulls and teeth, which are consequently of great request among them, as formerly in Sumatra, the ancient inhabitants of which are said to have originally had no other money than the skulls of their enemies. The Harafors are found in all the Moluccas, in Celebes, the Philippines, and Maguindano, where they are termed Subano or Manubu; and the ferocious race mentioned by Marfin, who live inland from Samanka in Sumatra, and are accounted to avenge their own faults by offering the heads of strangers to the chiefs of their villages, are probably of the same description. Ab. Ref. vol. x.

TIRULELORE, a town of Hindooflan, in the Carnatic; 20 miles E. of Tanjore.

TIRY, or TIRED, one of the islands of the Hebrides, situated in the district of Mull, and shire of Argyile, Scotland, is about 11 miles in length, and 24 miles in breadth. Its coast is mottly rocky, and intersected with many beautiful sandy bays, some of them a mile broad. About one-half of the surface is arable, intersected with small rocks and rising grounds, none of which are above 250 feet above the sea-level; but the surface in general is so even, that the waves are often seen from the shore rising apparently several feet above the level of the other. In the centre of the island is a large plain, which contains about 12,000 Scotch acres, and is elevated about six feet only above high-water mark; consequently, in stormy weather the sea often meets across this plain, and is productive of bad confquences. The inhabitants have endeavoured to avert this evil by building a defence of stone and earth on the one side, while the sea, on the other, has raised a considerable barrier of bowlder stones; yet neither has been sufficient to re-fill the waves of the Atlantic. Here are several lakes, covering in all about 600 acres; in one of these is a small island, on which are the remains of an ancient castle, on the site of which a neat house has been erected for the residence of the factor of the duke of Argyile, who is proprietor of the whole island. The fisheries employ a number of hands, as well as the manufacture of kelp, of which about 245 tons are annually made. The hill of Cean-Mharra, the western point of the island, is remarkable for a great number of large natural caves, frequented by innumerable flocks of sea-fowls. Here are the remains of many Danish forts, and also of several old chapels, at some of which burying-grounds and crosses are still visible. In the time of St. Columba, this appears to have been part of the patrimony of
of that church. Here is a parochial school, and also one established by the Society for Promoting Christian Knowledge, both of which are well attended. The population of the parish (which comprehends the islands of Coll, Gurna, and Tirey) was, in the year 1811, estimated at 3186. There is a regular ferry from Tirey to Coll, three miles distant, which is often dangerous, owing to a heavy swell from the Atlantic, and a rapid current over rocks and shifting sands. The two islands appear to have been formerly united: the isle of Gurna, which lies in the sound, being apparently part of the intermediate land which has escaped submergence. — Beauties of Scotland, vol. v. Carliile's Topographical Dictionary of Scotland, vol. ii.

TIRYNS, in Ancient Geography, a town of the Argolid, N. of Midea, situated in an enclosure of the mountains; called anciently Halicis, or the town of fishermens, from its having been the abode of the Heroniean fishermen. In the time of Pausanias it was in ruins.

TISŒUS, or TISÉUM, a very lofty mountain of Thebaly.

TISALPHATA, a town of Mesopotamia, situated W. of Tigris, on one of the small rivers which discharged themselves into the Mygdonius.

TISBURY, in Geography, a small fishing town on the N. coast of Martha's Vineyard, belonging to the state of Massachusetts.

TISCHNOWITZ, a town of Moravia, in the circle of Brunn; 13 miles N.W. of Brunn.

TISDALE, TUSCHRA, or Thybrus, in Ancient Geography, a town of Africa, six leagues S.W. of Sarfura and five leagues S.W. of Achola. It has many ancient relics of altars, inscriptions, columns, and fragments of marble statues; and also the remains of an amphitheatre.

TISEBARICA, a country of Ethiopia, according to Arrian, which commenced near the port of Berenice, and extended along the Red sea, as far as the country of the Mofchophas.

TISHEET, in Geography, a town of Africa, with a salt-mine; 150 miles N. of Benown. N. lat. 17° 20'. W. long. 26° 10'.

TISHOLTZ, a town of Hungary; 10 miles E.N.E. of Libethen.

TISDIUM, in Ancient Geography, a town of Africa, the command of which, according to Sallust, was given by Metellus to Jugurtha.

TISPHONE, in Mythology, one of the three Furies. She is represented by the poets with vipers, sometimes as loyle serpents, intermixed with her hair, and sometimes as serpents growing from her head instead of hair. As she is one of the chief of all the infernal executioners, her robe is described either as dropping with fresh blood, or sniff with human gore: this robe is fastened round her with a serpent instead of a girdle; and she has sometimes vipers twisted round her arms instead of bracelets. They sometimes give her a torch in her hand wet with blood; sometimes a torch in one hand and a serpent in the other; and sometimes serpents in both.

TISTR, or TISI, in Chronology, the first Hebrew month of the civil year, and the seventh of the ecclesiastical or sacred year.

The Hebrews call it raft-habanna, that is, the beginning of the year. It answered to part of our September and October. On the first day of this month was kept the feast of trumpets, because the beginning of the year was then proclaimed by sound of trumpets. On this day they refrained from all sorts of fervile busineses, and offered in sacrifice a calf, a ram, and seven lambs. Levit. xxiii. 24. Numb. xxix. 1.

The tenth day of this month was the great day of expiation, and on the fiftenth the feast of Tabernacles began, which lasted till the twenty-second day inclusively. See SCENOPHEIA.

TISSA, in Ancient Geography, a small town of Sicily, at the northern foot of Etna, near the river Onobola. Ptol.

TISANAH, in Geography, a town of Hindoo, in the cercar of Sumbul; 16 miles S.W. of Sumbul.

TISIA, a town of Bengal; 35 miles S.E. of Patamow.

TISUE, CELLULAR, in Anatomy, the cellular substance. It is an expression borrowed from the tisue cellulare of the French, who also call it tisue muqueux. See CELLULAR Substance.

TISTE, in Geography, a port-town of Germany, in the county of Verden; 26 miles N.E. of Rotenburg.

TISURUS, TOZER, in Ancient Geography, a town of Africa Propria, S. of Adrametum, and 4 leagues S.W. of Tichafa. It has some Roman remains.

TIT, in Geography, a town of Morocco, near the Atlantic ocean; 8 miles S.W. of Mazagan.

TIT, in Rural Economy, a term provincially applied to a small flift horse, or fort of poney, and sometimes to other horses, as a handsome or ugly tit, &c.

TITALBARY, in Geography, a town of Bengal; 20 miles N.N.W. of Goragot.

TITALEE, a town of Bengal; 6 miles E. of Moorshedabad.

TITALLYA, a town of Bengal; 50 miles N. of Dinagepour.

TITAN. See LEVANT.

TITANA, in Ancient Geography, a town of Sicynia, E. of the river Sitia, and W. of the river Aephus; situated on a mountain, and regarded as a fortified town. Here was a temple of Eucalphius, and a statue of this god; and also a statue of Hygeia. In the temple of Eucalphius were nourished sacred serpents.—Allo, a small country of Sicynia,—Allo, a river of Asia, which had its source in mount Zagrus, and flowed into the river Sillas.

TITANIA, win, in Antiquity, a festival in memory of the Titans.

TITANIDÆ, or ARTEMIDÆ, the seven daughters of Chronus, son of Uranus, by Aftarte.

TITANIS, in Ancient Geography, the seven daughters of the western coast of Corfica, between the mouth of the river Ticarius and the town of Differa. Ptol.

TITANUM, in Mineralogy, a metal originally discovered by Mr. Gregor of Cornwall, in the grains of a black mineral found in the bed of a rivulet in the valley of Menai, in that county. It occurs also in different states of oxidation or intermixture in various parts of the world; and, according to the recent observations of M. Cordier, is a constituent part of most volcanic rocks. The oxyd of titaniu is reduced by exposure to an intense heat, being previously moistened with oil and surrounded by powdered charcoal.
TITANIUM.

Botany Bay.

According to Chenexix:

<table>
<thead>
<tr>
<th>Substance</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxyd of iron</td>
<td>49</td>
</tr>
<tr>
<td>Oxyd of titanium</td>
<td>40</td>
</tr>
<tr>
<td>Silex</td>
<td>11</td>
</tr>
</tbody>
</table>

100

Iserine is so called from having been originally found near the source of the river Iser, in Silesia: it is disseminated in a black, brownish black, with iron-fand. It occurs also with similar fand in the bed of the river Don, in Aberdeenshire. It is fusible in iron fand, but not in oxand. It is found in small grains and rolled pieces, with a rough and glimmering surface. The internal luftre is semi-metallic. Its fracture is conchoidal, which distinguishes it from menachanite, to which it bears a near resemblance. The specific gravity is 4.5. Before the blowpipe it melts into a blackish-brown coloured glass, which is slightly attracted by the magnet. The mineral acids have no sensible effect on it, but the acid of fugar extracts a portion of the titanium. According to Dr. Thompson, its constituent parts are

<table>
<thead>
<tr>
<th>Substance</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxyd of titanium</td>
<td>48</td>
</tr>
<tr>
<td>Oxyd of iron</td>
<td>48</td>
</tr>
<tr>
<td>Oxyd of uranium</td>
<td>4</td>
</tr>
</tbody>
</table>

100

Nigrine; Titane oxyd ferrifere de Haüy, is so called on account of its colour, which inclines to a velvet-black. It occurs, like the preceding species, in angular grains and in rolled pieces. The external luftre is glimmering, that of the fracture shining; the fracture is imperfectly foliated. It is opaque, and harder than menachanite. Nigrine is brittle, and gives a yellowish streak. The specific gravity varies from 3.700 to 4.740. It is not attracted by the magnet, and is infusible by the blowpipe, but with the addition of borax melts to a transparent hyacinth red globule. The acid of fugar extracts the titanium from this ore. It is found in alluvial ground in Transylvania, Bavaria, and the island of Ceylon: it occurs also in the granite of the Uralian mountains.

The constituent parts of nigrine are given as under:

Transylvania. Klaproth.

<table>
<thead>
<tr>
<th>Substance</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxyd of titanium</td>
<td>84</td>
</tr>
<tr>
<td>Oxyd of iron</td>
<td>14</td>
</tr>
<tr>
<td>Oxyd of manganese</td>
<td>2</td>
</tr>
</tbody>
</table>

100

The Uralian Mountains. Lowitz.

<table>
<thead>
<tr>
<th>Substance</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxyd of titanium</td>
<td>53</td>
</tr>
<tr>
<td>Oxyd of iron</td>
<td>47</td>
</tr>
</tbody>
</table>

100

Octahedrite; Schorl bleu, Romé de Lisle; Titane anatafe, Haüy. This ore of titanium is so called from its constant occurrence in crystallized forms, which are varieties of the octahedron.
and brittle. The crystals are small; the surface is transfusively iridescent, and has a semi-metallic lustre; the internal lustre is also brilliant. The structure is foliated. This mineral is more or less semi-transparent; it scratches glass, and is brittle. The specific gravity, according to Haüy, is 3.8571. The colour of oolchydron is indigo-blue, paling through many shades to brown. It is infusible by the blowpipe, but with borax it forms a reddish-brown coloured glas. At the extremity of the flame, the brown colour changes to blue, and becomes opaque; by the continued action of the blowpipe, the brown colour reappears, and may be again changed by variation of temperature. This mineral is rare; it occurs in veins with felspar, azinite, rock-crystal, and chlorite, in the primitive rocks of Dauphiny, and in drusy cavities in limestone, at Hadeland, in Norway.

_Sphen e and Rutile._—These ores of titanium have been already described. (See _Sphen e_ and _Rutile_.) In addition to those articles we may state, that common sphenite has been discovered in small crystals in the heath of the mountains in Galloway, and on the south side of Loch-Nefs; in the granite of Bennevis and Aberdene; and also in other parts of Scotland. Rutile has also been discovered in the granite of Caingorm, and near to Beddgelert, in Carnarvonshire.

_TITANOS_, a word used by some authors to express lime; by others of the calc of burnt gypsum or plaster of Paris, and by others a lustrum of quicklime.

_TITANS_, _TITANIS_, _TITANS_, in the _Ancient Mythology_, the fons of Uranus or Cetus, and Veïa, or Titza, or Terra, i.e. of Heaven and Earth, according to Hefiod and Appollodorus; or, which comes to the same thing, of Ethere and Tellus, according to Hyginus. They are said to have derived their name from their mother, and hence the most ancient fabulous histories have made them pafs for sons of the Earth. Appollodorus reckons five Titans: Oceanus, Cetus, Hyperion, Crius, Iapetus, and Saturn or Cronus; Hyginus also reckons five, viz. Briareus, Gyges, Sterope, Atlas, Hyperion, and Cottus; but he seems to include the hundred-handed giants in the number, which Appollodorus, and the generality of mythologists, distinguish from the Titans.

The tradition is, that Cetus, by the same wife Veïa, had Briareus, Gyges, and Cottus, the hundred-handed giants, and had chained them up in Tartarus: Veïa, the earth, their mother, repenting this treatment, rai'd the Titans against their father, her husband; all, excepting Oceanus, made war upon him and dethroned him, setting up Saturn in his place.

Saturn, it seems, proved no more favourable to them than his father; but continued the giants in their prizon. Upon this, Jupiter revolted against Saturn; serving him as he had done Cetus; and rescued the three giants; who afterwards proved of great service to him in the war which the Titans waged against him.

This war lasted ten years: but at length the Titans were vanquished; Jupiter remained in peaceable possession of heaven; and the Titans were buried under huge mountains thrown on their heads.

Hyginus gives another origin of the Titans: he derives them from Titan, Saturn's eldest brother, by Cetus and Veïa; who, though presumptive heir of heaven, yet finding his father and mother more inclined for Saturn than for him, surrendered to him right of succession, on condition he should not bring up any male child, that the empire of heaven might revert to his own line the Titans.

But Jupiter, Neptune, and Pluto, having been afterwards ficed by the artifice of Ops, Titan, and his sons the Titans, made war on Saturn, who had dispossessed his father Uranus of the throne, and acquired an extensive empire, vanquished and imprisoned him; thus he continued in the power of his enemies, till Jupiter, who had been conveyed by his mother Rhea for safety to the Isle of Crete, being grown up, left Crete, made war on the Titans, and delivered his father.

Having re-established him on the throne, he returned to the place of his retreat. Saturn afterwards regained for some time in tranquillity; but upon consulting an oracle, he received information that he would be exposed to danger from the young progeny of his sons. Accordingly he recurred to all possible means for getting aid of Jupiter. Having fought him in Crete, he was betrayed and constrained to make a hasty retreat into the Peloponnesus. Thither Jupiter pursued him, and obliged him to take sanctuary in Italy, under the protection of Janus.

The Titans, thus, dispersed through several countries of Greece, being jealous of the power of this new conqueror, as they had been of his father's, levied troops against Saturn, and gave him battle; but being defeated, they retired into the interior parts of Spain, whither Saturn followed them. Jupiter fought them out in their retreat, and beat them for the last time near Tartessus, and with this battle terminated the war, which had lasted ten years. Saturn made his escape into Sicily, and there, as it is said, died from grief. With this last victory, and the defeat of Saturn, commenced the reign of Jupiter. During the war of the Titans, Atlas feiz'd on those provinces of Africa which were remote from the centre of the empire. Pluto was sent governor of the western parts of the empire of the Titans, of the Gauls, and Spain, which government, after the death of Pluto, was given to Mercury, who is said to have become the great divinity of the Celts; and Jupiter referred to himself the whole East, that is, Greece, the Isles, and that part of Asia whence his ancestors came. For the explication of the fable that represents the Titans as thrall'd down to Tartarus by Saturn, see _Tartarus_.

The most judicious among our mythologists, such as Gerard Voëlius, Marfham, Bochart, and father Thomassin, are of opinion that the partition of the world among the fons of Noah, Shem, Ham, and Japhet, was the original of the tradition of the fame partition among Jupiter, Neptune, and Pluto; and hence they have been led to form comparisons between the three fabulous princes, and the three fons of the patriarch. Accordingly the learned Pezron contends that the division which was made of this vast empire, came in after-times to be taken for the partition of the world: that Asia remaining in the hands of Jupiter, the most potent of the three brothers, made him look upon as the god of Olympus, a celebrated mountain where he had his residence, and which was afterwards taken for heaven itself: that the fons and islands which fell to Neptune, occasioned their giving him the title of god of the sea; and that Spain, the extremity of the then known world, thought to be a very low country in respect of Asia, and famous for its excellent mines of gold and silver, falling to Pluto, occasioned him to be taken for the god of the inferior regions. However this be, the empire of the Titans, according to the ancients, was very extensive. These princes were poiffessed of Phrygia, Thrace, a part of Greece, the island of Crete, and several other provinces, to the inund receifes of Spain. To these Sancho-family tends to join Syria; and Diodorus adds a part of Africa and the kingdoms of Mauritania.

T. Pezron, in his _Antiquity of the Cельt_, makes that people to be the fame with the Titans; and their princes to be the same with the giants in Scripture. According to him, the
The Titans were the descendants of Gomer, the son of Japhet. He adds, that the word Titan is perfect Celtic, and derives it from τίταν, earth, and δεν or δεν, man; and hence it was the Greeks also called them very properly γηγενες, earth-born.

Banier observes, that although most of the ancients have confounded the giants (see Rebel Giants) with the Titans, they ought to be distinguished. The latter, he says, were of an illusrious family, and extended their empire over one part of the world; the others were so many banditti diffpered over Thessaly, who occasioned great trouble to the Titans. Hefiod distinguishes them from one another, and states that the giants were not born till long after the overthrow of the Titans, and after the wars which they carried on against the others. The occasion of confounding them seems to have been, that both the giants and the Titans made war upon the gods; with this difference, that the Titans, though of the same race, had often separate interests; some taking part with Saturn, and others with Jupiter; whereas the giants were a gang of robbers, who had a design equally upon all the Titans. Both giants and Titans were represented as sons of Heaven and Earth, and hence they have been confounded, for want of considering, what Apollodorus says, that Earth brought forth the giants only because she was incensed against Jupiter for keeping the Titans shut up in Tartarus. Thus the Titans were born long before the giants.

The Titans, according to the learned Mr. Bryant, were those Cuthites, or sons of Chus, called giants, who were employed in building the tower of Babel, and who were afterwards difabled. See Dispersion of Mankind.

He supposes that they were denominiated from their religion and place of worship, Titans, which is represented as the mother of these people, being compounded of Τιταν, and signifying literally a bright or earth-like sun; of the Greeks, and therefore expressing the figure as well as the materials of the ancient altar, which consisted of a conical hill of earth, in the shape of a woman's breast. These altars were also called Tit-an and Tit-anis, from the great fountain of light, flyled An and Anis. Hence many places were called Titana, and Titana, where the worship of the sun prevailed; for Anes and Hono signified the fountain of light or fire. Titan was sometimes expressed Titana, and by the Ionians Tithena; and Tithena was said to be the nurse of the Titans. But Titana their mother, and Tithena their nurse, were all of the same nature, viz. altars razed of soil. He adds, in his account of the disperion of the Titans, and of the floods which preceded (Theogon. ver. 676, &c.), that the Deity at last interposed, and put the Titans to flight, and condemned them to reside in Tartarus at the extremities of the earth; but Mr. Bryant observes, that he has confounded the history by supposing the giants and Titans to have been different perons. The sons of Chus, he says, were the aggressors in those acts of rebellion described by the poets as the war of the giants, who were also represented under the character of the Titanians. The fictions of the poets with regard to the banishment of the Titans after their war against heaven, took their rise from this true history. A large body of Titanians, after the dispersion, settled in Mauritania, upon the Atlantic ocean, which is the region flyled Tartarus, and represented as the realms of night; because it was situated in respect to Greece towards the regions of the setting sun. The term ζενε, by which it was expressed, signified both the west and darkness; as did also Ereb, ζενε, whence Erbus, which was also another name for Tartarus, to which the poets condemned the Titans and giants. The first war of the Titans, according to this ingenious writer, confisted in acts of apostacy and rebellion against heaven; and this refers to that part of the history of the fons of Chus, which represents them as building a mighty city in the region, which they had usurped, and erecting a lofty tower, to prevent their being scattered abroad: but there was another war in which they were engaged with men, which happened in confequence of the dispersion. This was no other than the war mentioned by Moses, which was carried on by four kings of the family of Shem, against the fons of Ham and Chus, to avenge themselves of these enemies by whom they had been greatly aggrieved. See Bryant's Analysis of Ancient Mythology, vol. iii. p. 48, &c. p. 71, &c.

The word Titan is also used by the poets for the sun, in which case it is likewise Celtic, though from another root, being formed from ις, house or habitation, and ην, fire.

Hefychius observes, that Titan is likewise used for lodoimite. He adds, that it is also one of the names of Assyrian, in which case it must be written Tisian, in Greek, to contain the numerical letters of 666. which in the Apocalypse, xiii. 18, is the number of the beast. TITANUS, in Ancient Geography, a town of Asia Minor, on the coast of the Aeolide, on the banks of a river of the same name.

TITARESSUS, a town of Asia, in Lesser Armenia, in the country named Malitane. Ptol.

TITARESUS, or Titaresus, a river of Thrasyly, mentioned by Homer, which had its source in mount Titarus.

TITAY, in Geography, a town of Bengal; 55 miles N. of Dinagopour.

TITCHFIELD, a small market-town in the hundred of the same name, in the Portford division of the county of Hants, England; is situated near the Titchfield river, 3 miles W. from Fareham, and 58 miles S.W. from London. It is inhabited by many respectable families. The church, which is the only object of particular notice, is a spacious edifice, of the workmanship of different ages: the N. nave is said to have been built by William of Wykeham; but the S. nave is more ancient. In the S. chancel is an interesting monument to the memory of Sir Thomas Wriothesley, 1st earl of Southampton, Jane his lady, and Henry their son, the second earl; all of whom are represented by effigies on the tomb. Four annual fairs are held in Titchfield; and a weekly market on Saturdays. The population of the parish, under the act of 1811, was returned as 3227, the number of houses at 535.

At a short distance from the town, on the N., are the ruins of Titchfield House, the ancient seat of the Wriothesleys. It was erected, by the 1st earl of Southampton, on the site, and with the materials of an abbey, founded for Premonstratensian canons, by bishop Peter de Rupibus, in the year 1231. The annual revenues of this establishment, at the period of the dissolution, amounted, according to Dugdale, to 246l. 16s. 1d.; but according to Speed, to 280l. 19s. 4d. Its possessions were then granted by Henry VIII. to his favourite secretary, Wriothesley, who built here, Leland reports, "a righte fourteen houses, and having a good gate, and a conduit caflelid in the middle of the court of it, in the very fame place where the late monaftic foode." This building is now in a very dilapidated state: the entrance gateway is the principal part left standing; fourteen rooms having been recently pulled down for the sake of the materials. The estate is the property of John Delmé, esq. of Cam's Hall. In Titchfield House, Charles I. was concealed after his escape from Hampton Court in 1647, and previous to his resigning himself to colonel Hammond, who...

TITCHVINE, a town of Ruffia, in the government of Nvgorod, on the river Stias, 84 miles N.N.E. of Novgorod. N. lat. 59° 52'. E. long. 33° 14'.

TITE. See Tithe.

TITEA, in Mythology, the wife of Uranus or Cebus, by whom he is said to have had eighteen children, each of which had his own name, though they were generally designated by the appellation of Titan; which see. This princess, after her death, received divine honours, and she was called after her name.

TITERNUD, in Geography, a town of Norway, in the province of Agerhus; 38 miles N. of Christiana.

TITIENIDIA, zeum, in Antiquity, a Spartan festival, so called from zealot, nurset, who at this time carried the male infants committed to their charge to the temple of Diana Corynthia. For the ceremonies observed on this occasion, see Potter, Archæol. Græc. lib. ii. cap. 20. tom. i. p. 432, seq.

TITHE, Tythes, Tenth, Decima, or Diximes, the tenth part of the increase, yearly arising and renewing from the profits of lands, the rock upon lands, and the personal industry of the inhabitants; allotted to the clergy for their maintenance.

Tithes essentially differ from offerings, oblations, and endowments, which are the customary payments for communicants at Easter, for marriages, christenings, churching of women, burials, and such like. See Oblations.

Tithes, with regard to their several kinds or natures, are personal, predial, and mixt.

Tithes, Personal, are those due or accruing from the profits of labour, art, trade, navigation, and industry of men; and of these, only the tenth part of the clear gains and profits is due; after charges deducted.

Tithes, Predial, are those which arise merely and immediately from the ground; as grain of all sorts, hay, wood, fruits, herbs; for a piece of land or ground, being called in Latin præedium (whether it be arable, meadow, or pasture), the fruit or produce of it is called predial.

Tithes, Mixt, are those which arise not immediately from the ground, but from things immediately nourished by the ground; as from beasts, and other animals fed with the fruits of the earth; as colts, calves, lambs, chickens, milk, cheese, eggs.

Tithes, with regard to their value, are divided into great and small.

Tithes, Great, are those of corn, hay, and wood.

Tithes, Small, are the predial tithes of other kinds, together with those that are called mixt and personal. It is said, that this division may be altered by custom, which will make wood a small tithe in the endowment of the vicar; by quantity, which will confer a small tithe into great, if the parish is generally cultivated with it; and by change of place, which makes the same things, e.g. hops in gardens, small tithes, in fields great tithes. But it has been admitted, that the quantity of land within any parish, that is cultivated for a particular produce, cannot change the nature of the tithe; and, according to this opinion, the law is now settled, that the tithes are to be denominated great or small, according to the nature and quality of them, and not according to the quantity.

It has been laid by lord Coke and many others, that before the council of Lateran in the year 1185, a man might have given his tithes to what church or monastery he pleased; but this is denied by Dr. Prideaux. It is now certain, that

tithes of common right do belong to that church, within the precincts of whose parish they arise; and this regulation, corresponding with the ancient Law of the land, was enjoined by a decretal epistle of Innocent III. to the archbishop of Canterbury, in the year 1200. (2 Infr. 641. 2 Blackf. Com. 27.) But though one person may prefer to have tithes within the parish of another; this is what is called a "portion of tithes." (Gibson, 663.) Tithes extra-parochial, or within the compass of no certain parish, belong to the crown, and may be granted to whom the king will. 1 Roll's Abr. 657. 2 Infr. 647.

It is a general rule, that of common right tithes are to be paid for every thing that yields an annual increace; but this rule admits of exceptions, e.g. the tithe is due from farron, though gathered but once in three years; and on wood that is felled or lopped, called clyva cedaw, though it is not renewed every year: and on the other hand, tithes shall be paid for the produce of seeds, as of clover, found on the same ground, thoug renewed oftener than once a year. No tithes shall be paid of common right for any thing that is of the substance of the earth, or which is not of annual increace, as lime, coal, tin, lead, and such like; nor for creatures that are fere nature, or of a wild nature, as deer, hawks, fish, &c. whose increace is so as to profit the owner is not annual, but casual; unless tithes in either of these cases are payable by custom. Degge, p. 2. c. 8. 1 Infr. 651. 664.

Lands, and their occupiers, may be exempted or discharged from the payment of tithes, either in part or totally, by a real composition, or by custom and prescription.

A real composition is when an agreement is made between the owner of the lands, and the parson or vicar, with the consent of the ordinary or patron, that such lands shall for the future be discharged from payment of tithes, by reason of some land, or other real recompence given to the parson, in lieu and satisfaction thereof. But these compositions are now restrained by the disabling statute 13 Eliz. cap. 10. See Composition.

A parson may bind himself by deed to accept of a composition for tithes during life, or incumbency of a particular living. It is also very common to agree by parol for an annual composition for tithes, which binds the parties to it till sufficient notice given of dissent from the agreement, but what is sufficient notice to determine such an agreement, has never been decided in terms. See Leases by Statute.

A discharge by custom or prescription is, where time out of mind such persons, or such lands, have been either partially or totally discharged from the payment of tithes. The difference between custom and prescription is this: Custom is that which gives right to a province, county, hundred, city, or town, and is common to all within the respective limits; in pleading of which it is alleged, that in such a county or the like, there is, and time out of memory hath been, such a custom used and approved therein. Prescription is that which gives a right to some particular house, farm, or other thing; in pleading of which it is alleged, that all they whole estate is had in such land, have time out of mind paid so much yearly, or the like, in full satisfaction of all tithes arising on those lands. (Gibson, 674.) And there is this difference between a prescriptive and customary modius, that the former is annexed to the lands which it covers, whereas the latter exists in action of law, independent of the lands by force of the custom of the district. In a prescriptive modius, therefore, the lands must be definite, and not liable to shift. And therefore a bill to establish a modius for every ancient farm, but not setting out the abutments of each, was dismissed,
TITHES.

diminished, although it was stated that the whole parish consisted of ancient farms. (See Custom and Prescription.)

This custom, or preference, is either de modo decimandi, (see Modus Decimandi,) or de non decimando. No modus can be established at this day, but by act of parliament. A modus founded upon good considerations may be in various ways discharged, and tithes become due in kind: as,

1. Where land is converted to other uses: so, when the preference is for hay and grases, specially, in so many acres of land; if the land is converted into a hop-garden or tilage, the preference is gone.

2. By the alteration or destruction of the thing for which the money was paid: as where two fulling-mills were under the same roof, and turned into a corn-mill; where also there was one pair of rolls in a mill, and another pair was added; and where the water-course was altered by the owner, and the mill was pulled down and re-edified upon it; in all these cases, it was adjudged that the modus was gone. But where a man was feated of eight acres of meadow and one of pasture, for the tithes whereof he had paid time out of mind 51. 4d. and afterwards the owner built a corn-mill upon the same; it was adjudged that he should pay no tithes for the corn-mill, because the land was discharged by the modus. 2 Inf. 490.

3. By non-payment of the consideration, or payment of tithes in kind, for so long a time as to destroy the possibility of making proof that such custom or prescription was: but an interruption for some short time only, will not discharge it; especially if made by the lessee, to the prejudice of the lessor. Watf. c. 47.

The rule is, that the modus is to be fixed for in the ecclesiastical court, as well as the very tithe; and if it be allowed between the parties, they shall proceed there; but if the custom be denied, it must be tried at the common law; and if it be found for the custom, then a consultation must go; otherwise the prohibition standeth. The like is affirmed, in case a jury upon an issue joined in a prohibition upon a modus decimandi, find a different modus; since a modus is found, they shall not have consultation. 2 Inf. 490.

The principal reason why the courts of common law prohibit the spiritual court from trying of moduces, is, that whereas every modus is less than the real value, the rule of the canon law is, that less than the real value shall not be taken, and that a custom to the contrary is void; and that the ecclesiastical and temporal laws differ in the times of limitation, forty years or under making a good custom by the ecclesiastical laws, whereas by the temporal laws it must be beyond the time of memory. Gibf. 691.

But the spiritual courts have commonly allowed and do allow pleas of modus decimandi; and the averment in the prohibition is not that they do take cognizance, but that the plea hath been offered and refused; which supposeth, that if the plea be admitted, the prohibition ought not to go. And accordingly it hath been affirmed by Doderidge and others, that the spiritual court may as well try the modus, as the right of tithes, and that a prohibition is not to be granted, till the spiritual court either refuse to admit the plea, or proceed to try it by methods different from the rules of the temporal law, as to the time of limitation, or number of witnesses, or the like. And where lord Coke contended for the contrary doctrine, it was declared by Kelyng and Twidacen, that in case one libel for a modus decimandi, if the spiritual court allow the plea, they may try it. Gibf. 691.

But, notwithstanding it, feemeth now to be clearly settled, that if a modus decimandi be fixed for in the ecclesiastical court, a prohibition lies to stop the trial of it, if the modus be denied; and the reason is not upon the account that the spiritual court wants jurisdiction, but in regard of the notion the temporal law hath of custom, different from the spiritual: and seeing that every modus is due by custom, it is the common law only that can determine, what time and usage with us shall be sufficient to create such custom, that is, time beyond all memory to the contrary. Whereas by the spiritual law, sometimes ten years, sometimes twenty, they will adjudge sufficient to create a custom. And prohibitions in such cases are granted, not because the spiritual court hath not jurisdiction of the matter, but in respect of the trial which is to be by the temporal law only; and if upon the trial it be found for the modus, the proceedings shall go on in the spiritual court; if against the modus, the prohibition shall stand. Watf. c. 56.

If in the trial of a modus, the defendant permits the spiritual court to proceed to sentence, he is then too late to come for a prohibition; because it is only for defect of trial, and not for defect of jurisdiction: but a man is never too late for a prohibition, where it is for defect of jurisdiction. Bumb. 17. 10 East's Rep. 349.

A bill in equity, in the nature of a bill of peace, will also lie to establish a modus, where a suit has been instituted for tithes in kind; but a bill to establish a modus or customary payment in lieu of tithes, cannot be supported, where there has been no attempt to enforce the payment of tithes in kind. Gwill. 1596.

The following moduses have been established as good, by decisions in the courts of law: One penny for ancient gardens and orchards. (Bumb. 79.) Seventeen-pence for every cow having a calf, for the tithe of the milk and calf; eleven-pence for the tithe of the milk of a milk cow, milked without a calf; for every heifer, the first year she has a calf, thirteen-pence for the milk and calf—these payable at Michaelmas. Eight-pence for every hoghead of cyder, made of apples grown in the parish; for hoard apples, one penny; for firewood sold on the farm, one heath penny; for fruit, herbs, roots, and other garden stuff, a garden penny; for a calf, one penny;—these payable at Easter. (Bumb. 57.) Eight-pence for a cow, four-pence for an heifer; three shillings and four-pence, payable at Easter, for every score of sheep born out of the parish, and so proportionably for a lease number than twenty, or for a lesse time than a year, for their wool and lambs. (Bumb. 171.) Two-pence an hoghead for cyder. (Roll. Abr. 649.) The non-resident occupiers of land in B. and W. to pay on Good Friday, or as soon after as demanded, four-pence an acre for the tithe of hay, and the herbage of pasture lands not ploughed or sown but, if residenst, to pay tithes in kind. (2 P. Wms. 565.) Four-pence an acre for high land, and three-pence an acre for low land. (Ibid.) Twelve-pence for an acre of low meadow, and eight-pence for an acre of high meadow, for the tithe of hay. (1 Bro. P. C. 214.) One penny for hay for an ancient meadow, with the demesne lands thereunto belonging, containing 60 acres, &c. One pound six shillings and eight-pence for an ancient tenement, containing 625 acres, for hay, small tithes, and Eater offerings. (Bumb. 161.) Nine cart-loads of logwood, delivered to the rector by the lord of the manor, for himself and tenants, in lieu of all tithes. (Bumb. 279.) So of six pounds per annum. (Cro. Eliz. 559.) A halfpenny for each calf, in lieu of calves, payable on Wednesday before Easter. A smock penny for firewood. An halfpenny, payable on Shear-day, for the wool of each sheep dying between Candlemas and Shear-day. Four-pence a month, payable on Shear-day, for the tithe wool of every hundred sheep born in the parish, which were brought in after the 2d day of February. Three
Three eggs for every cock and hen, duck and drake, payable on Wednesday before Easter, in lieu of tithes of eggs, and chickens and ducks hatched in the parishes. (Bunb. 307.)

Thirty eggs for all tithes of eggs. (1 Roll's Abr. 648. 651. 2 Salk. 676.) The tenth chees made from the 18th of May until the fall of August, in discharge of the tithes of milk. (Cro. Eliz. 669.) An halfpenny for the wool of sheep sold after shearing, and before Michaelmas. (Moore. 911.)

One penny per head for sheep brought into the parishes after Candlemas, and clipt in the parishes, in lieu of tithes of wool; three pence per head for sheep in the parishes before Candlemas, and carried out before shearing time, though the wool tithe is not then actually due. (1 Ant. 341.) It is a good modus for an innkeeper, that in consideration that he and all, &c. have paid tithes hay and grain growing upon the land belonging to the said inn, and have paid tithes for all their own cattle feeding upon the land, that they have been time, &c. discharged of the tithes of the horses of their guests agisted in the said land, when they travel by the said inn; for some have said that this was but a personal tithes, and others have said that no tithes should be paid for such agistment by the common law, without any modus. 9 Vin. Ab. 13.

The things that are titheable are, for the most part, as follows: corn is a predial great tithe, and titheable according to the custom of the place, commonly by the tenth shock, cock, or sheaf. Beams and pease, expended in the house, are subject to no tithes; but if they are gathered to be sold, or to feed hogs, they are titheable, and are in their nature great tithes. Hay is a predial great tithe, and is to be tithe in swearth or cocks, according to the custom of the place. Clover, rape, and wood, are small tithes; heath, furze, and broom are also titheable: but no tithe shall be paid of fern. (2 Ant. 651.) The tithe agistment is a small tithe, and due of common right. Wood is a predial tithe, but whether great or small, hath been questioned between the parsons and the vicars; but it has been resolved, that if a vicar be endowed with the small tithes, and has always had tithewood, in such case it shall be accounted a small tithe, otherwise it is to be accounted among the great tithes. Timber fit for building of houses and ships, and comprehending oak, elm, and ash, are exempted from tithes, by 2 Edw. III. c. 3: but timber-trees, cut and corded for fuel, have been adjudged to pay tithes, as well as under-wood; however, no tithe shall be paid for the roots of trees, for wood cut for husbandry or fuel, for hurdles of sheep, for hop-poles, and for making of bricks, and also fruit-trees. When the wood is titheable, it is fet out while standing by the tenth acre, pole, or perch; or, when cut down, by the tenth faggot or billet.

Of under-woods sold standing, the tithe shall be paid, not by the seller, but by the buyer. The tithe of flax and hemp is a small tithe, and by statute this is charged at 5̅ per acre. (11 & 12 Will. c. 16.) The tithe of madder is also a small tithe, and charged at 5̅ per acre, by 31 Geo. II. c. 12. The tithe of hops is predial, and reckoned among small tithes; it is not to be paid till after they are picked, and before they are dried, every tenth measure. Out of gardens is paid tithe of all garden herbs and plants, which are small tithes, and may be demanded in kind: potatoes and turnips are also small tithes, as are likewise tobacco and saffron. However, in lieu of the tithes of gardens, a certain consideration in money is paid, either by custom, or by agreement with the parson. Fruits of trees, as apples, pears, plums, cherries, and the like, are predial tithes, to be paid in kind when they are gathered, unless there is some modus, or rate-tithe, paid in lieu of them. The tenth calf is due to the parson of common right; and if there are seven, he shall have one; if under seven, a halfpenny, or what custom shall direct, for each calf. But in most places, at this day, the custom hath obtained, that if there are five, the parson shall have the value of half a calf, lamb, or other fuch like; if there are six, he shall have one entire; and shall receive or pay out respectively a proportionable sum for each number under five, or above six. Colts and pigs are titheable in the same manner as calves; and the time of payment of their tithes is when they are so old that they may be weaned. Wool and lamb are generally reckoned mixt small tithes. Milk is a mixt tithe; where tithe-milk is paid in kind, no tithe-cheese is due; and where tithe-cheese is paid in kind, no tithe-milk is due. The tithe of milk is to be paid, not by the tenth part of every meal, but by every tenth meal entire. Deer and conies, being fere nature, are not titheable of common right, but by special custom. Of fowls, which are domestic, as geese, hens, and ducks, tithes are to be paid, either by paying the tenth egg, or the tenth of their young, according to custom. It hath been adjudged, that the paying of thirty eggs in Lent, is a good modus for all tithes of eggs. Bees are free of tithes, but the wax and honey are chargeable at the rate of the tenth measure of honey, and the tenth weight of wax. By the books of common law it appears, that some tithe or other is due for a mill. Fish in ponds and private fisheries, and in common rivers, are titheable only by custom. Firth taken in the sea are chargeable by custom as a personal tithe. Personal tithes are regulated by Stat. 2 & 3 Edw. VI. c. 13; but personal tithes are now scarcely anywhere paid in England, unlefs for mills or fish caught in the sea, and then payable where the party hears divine service, and receives the sacrament.

The manner or form of setting out or payment of tithes, is for the most part governed by the custom of the place. The parson, vicar, impropritor, or farmer, cannot come himself, and set forth his tithes, without the licence and consent of the owner; for if of his own head he shall tithe the corn or hay of any land-holder within his parish, and carry it away, he is a trespasser, and an action will lie against him for it. But every person is bound of common right, to cut down, and set out the tithes of his own lands. And that it may be done faithfully and without fraud, the laws of the church entitle the parson to have notice given him; but by the declaration of the common law, such notice is not necessary. Yet nevertheless, the common law declareth a custom of titling without view to be an absurd custom; and by the statute of 2 & 3 Edw. VI. c. 13, it is enacted, that at all times whensoever, and as often as any predial tithes shall be due at the tithing of the same, he shall be lawful to every party to whom any of the said tithes ought to be paid, or his deputy or servant, to view and see the said tithes to be justly and truly set forth and severed from the nine parts.

The care of the tithes, as to waste or spoiling, after sequestration, rests upon the parson, and not upon the owner of the land. For it is deemed that the parson is at his peril to take notice of the tithes being set out; and if it hath been declared, that although the parson must ought de jure to reap the corn, yet he is not bound to guard the tithes of the parson. Gibb. 689.

But after the tithes are set forth, he may of common right come himself, or his servants, and spread abroad, dry and stack this corn, hay, or the like, in any convenient place or places upon the ground where the same grew, till it be sufficiently weathered and fit to be carried into the barn. But he must not take a longer time for the doing thereof, than what is convenient and necessary; and what shall be deemed a convenient and necessary time, the law doth not nor can define: for the quantity of the corn or hay, and the weather,
TITHES.

Tithes are recoverable in the spiritual court by the canon law, and by divers statutes, as the statute of *circumspice agatis*, 13 Edw. III. I. 4.; the statute of *articuli eleri*, 9 Edw. II. I. 1. c. 1. 18 Edw. III. III. 3. c. 7. 1 Rich II. c. 13. 14. 27 Hen. VIII. cap. 20. 32 Hen. VIII. c. 7. 2 & 3 Edw. VI. c. 13. 7 & 8 Will. III. c. 6. 34. 1 Geo. II. c. 6. 27 Geo. II. c. 20.

Tithes in London are subject to particular regulations. By a decree made in 1545, according to the statute 37 Hen. VIII. c. 12, it is ordered, that the citizens and inhabitants of London and its liberties, shall yearly pay their tithes to the parsons, vicars, and curates, after the rate of 16s. 4d. for every 10s. annual rent, and 21. 9d. for every 20s. rent, and to above the rent of 20s. by the year, ascending from 10s. to 10s., according to the said rate. The wife, children, servants, or others of their family, taking the tithes of the church at Easler, shall pay 2d. for their four offering days yearly, &c. Notwithstanding the settlement of this decree, divers prescriptions for the payment of lesser rates than the parsons might require by it (as to pay 10s. for the tithes of a house, although its rent was 40l. a year, or more) have been gained and allowed. But by 22 & 23 Ch. II. c. 15, after the fire of London, annual certain tithes, or sums of money in lieu of tithes, for fifty-one churches, were appointed to be raised by afeffions, in the manner prescribed by the said act. For the receipts of the ministers of the fifty new churches, provision is made by the several acts of parliament relating to them, to be raised from the duties on coals. There are also particular statutes for particular churches, in London and in other places.

Original and History of Tithes.—The custom of giving or paying tithes is very ancient; in Gen. xiv. 20, Abraham gives Melchisedec the tenth of all the spoils he had taken from the four kings he had defeated: in Gen. xxviii. 22. Jacob makes a vow at Bethel, to give the tenth of all the riches he shall gather in that fojourn, to God. But these tithes were free and voluntary, and, besides, differed in divers other respects from what was afterwards called tithes: what Melchisedec received, was only the tenth of the spoils, not of Abraham's possessions; and this once, not annually; and besides, not as maintenance, which Melchisedec wanted not, but as homage; add, that this was only from one priest to another; for Abraham had not only a priest in his loins, but was a priest himself. And as to Jacob, who was also a priest, what he did was the effect of a vow, voluntarily taken, to offer the tenth of all he should possess; not to any other priest, but to God himself upon an altar.

Tithes were first legally enjoined by Moses, Lev. xxvii. 30. Numb. xviii. 21. Deut. xiv. 22. That legislator obliged the Israelites to the payment of several kinds of tithes: as,

1. The first tithes were a tithe of all the fruits given to the Levites: this was not taken till after the oblation called *terumah*, which was a tenth part allotted to the priests, had been made.

2. The second tithes was a tenth part of the nine remaining, after payment of the first tithes. This tithes was set apart in each family, and the master of the family was obliged to carry it to Jerusalem, and to use it there; or, in case he could not, he was to redeem it, or convert it into money: in which case he was to add a fifth to it, and carry the money to Jerusalem.

3. The tithes of the tithe, was the tenth part of all the tithes that had been given to the Levites by the people: for the Levites, after they had got all their tithes of the people, divided the whole into ten parts; and in their turn gave a tithe to the priests.

4. The tithes of the third year was another kind of tithes, not much different from the second tithes, excepting that it was less troublesome; because they did not carry it to Jerusalem either in kind, or in money, but kept it by them, to be spent by the Levites, the strangers, the fatherless, and the widows of the place, Deut. xiv. 28, 29. This was also called the tithe of the poor, and the third tithes; and these third years when it was paid, were called the tithe years. Several learned Jews and Christians, however, conceived that this was not a distinct tithe, but the same as the second; so that, as Mr. Mede apprehends, what was wont in other years to be spent in feasting, was every third year spent upon the poor. All these tithes are calculated to amount to above one-sixth of the revenue of each person.

These matters are all farther explained in the Talmud, in which are two books on tithes: also in the book of benedictions, עָשָׂרְנֵי, in the commentaries of Bartonora, Maimonides, R. Schelomoh Jarrihi, in Scaliger, Amama, Selden, Fricchmann, Quenfant, Varenius, Hottinger, Sigounius, Cunzeus, Godwyn, Leidecker, &c.

Under the new law, tithes are not established by Jesus Christ, or Christian diffusion, as they were under the old law by the ministry of Moses, the Christian priests, and the ministers of the altar of the new covenant, lived at first wholly upon the alms and oblations of the devout. In after-times, the laity gave a certain proportion of their revenues.
TITHES.

revenues to the clergy, but voluntarily, and not out of any
constraint or obligation: the first instances we have of this,
are in the fourth and fifth centuries.

This gift was called tithe, not that it was really a tenth
part of their income, or near to such; but only in imitation
of the tithes of the old law.

In the following ages, the prelates in their councils, in
concert with the princes, made an express law to the pur-
pose; and obliged the laity to give a full tenth part of their
revenues, their fruits, &c. to the ecclesiastics.

This the church enjoyed without disturbance for two or
three centuries; but in the eighth century the laity got hold
of part of these tithes, either by their own authority, or
by grants and donations of the princes; and appropriated
them to their own use.

Some time afterwards they restored them, or applied them
to the founding of monasteries or chapters, and the church
conten ded, at least tacitly, to this restitution. In 1179, the
third council of Lateran, held under Alexander III., com-
manded the laymen to restore all the tithes they yet held to
the church.

In 1215, the fourth council of Lateran, held under
Innocent III., moderated the matter a little; and, without
saying any thing of the tithes which the laity already prof-
fessed, forbade them to appropriate or take any more for
the future.

We may observe, that, upon the first introduction of
tithes, though every man was obliged to pay tithes in general,
yet he might give them to what priests he pleased, which
were called arbitrary confecrations of tithes: or he might pay
them into the hands of the bishop, who distributed among
his diocesan clergy the revenues of the church, which were
then in common. But when dioceses were divided into
parishes, the tithes of each parish were allotted to its own
particular minister; first by common consent, or the ap-
pointments of lords of the manors, and afterwards by the
written law of the land. However, arbitrary confecrations
of tithes took place again afterwards, and became in general
use with us till the time of king John. This was probably
owing to the intrigues of the regular clergy, or monks of
the Benedictine and other rules, and will account for the
number and riches of the monasteries and religious houses
which were founded in those days, and which were fre-
quently endowed with tithes. But in process of years,
the income of the laborious parish-priests being scandalously
reduced by these arbitrary confecrations of tithes, it was
remedied by pope Innocent III. about the year 1200, in
a decretal epistle, sent to the archbishop of Canterbury,
and dated from the palace of Lateran, which enjoined the pay-
ment of tithes to the parsons of the respective parishes,
where every man inhabited, agreeably to what was after-
wards directed by the same pope in other countries. This
epistle, being reasonable and just, and correspondent to the
ancient law, was allowed of, and became lex terra. This
put an effectual stop to all the arbitrary confecrations of
tithes; except some footsteps which still continue in those
portions of tithes, which the parson of one parish hath,
though rarely, a right to claim in another: for it is now
universally held that tithes are due, of common right, to
the parson of the parish, unless there be a special exemption.
This parson of the parish may be either the actual incum-
bent, or else the appropriator of the benefice: appropri-
ations being a method of endowing monasteries, which
seems to have been devised by the regular clergy, by way
of substitution to arbitrary confecrations of tithes.

Fa. Paolo, in his "Treatise of Beneficiary Matters," is
opinion, that the custom of paying tithes, under the new
law, began in France; and affirms, that there are no in-
fances of it before the eighth and ninth centuries: but he
must be mistaken; for in the second council of Matifeona,
held in 585, it is said expressly, that the Christians had a
long time kept inviolate that law of God, by which tithes of
all their fruits was enjoined to be given to the holy places,
&c.

In effect, Orig en (Hom. x. on Numb.) thinks, that the
old laws of Moses, touching the first-fruits and tithes, both
of cattle and of the fruits of the earth, are not abrogated
by the gospel; but ought to be observed on their ancient
footing.

The 5th canon of the council of Matifeona orders tithes
to be paid to the ministers of the church according to
the law of God, and the immemorial custom of the Christians,
for the use of the poor, and the redemption of captives,
and that upon penalty of excommunication: which is the
first penalty we find imposed on such as would not pay
tithe. On which grounds it is that many among the modern
clergy hold their tithes to be juste divino.

Others, on the contrary, plead, that the recompense to
be given church ministers, is differently ordained by God,
according to the differences he has put between his two
great dispensations, the law and the gospel: under the law
he gave them tithes; under the gospel, having left all
things in his church to charity, and Christian freedom,
he has given them only what shall be given them freely,
and in charity. That the law of tithes is in force under the
gospel, all the Protestant divines, except some among the
English, deny; for though hire to the labourer be of moral
and perpetual right, yet that special kind of hire, the tenth,
can be of no right or necessity, but to the special labour
for which God ordained it; that special labour was the Levi-
tical and ceremonial service of the tabernacle, (Numb. xviii.
21. 31.), which was abolished: the right, therefore, of the
special hire must be abolished too.

That tithes were ceremonial, is evident from their not
being given to the Levites till they had been first offered
as an heave-offering to the Lord, ver. 24. 28.

He, then, who by the law brings tithes into the gospel,
brings in likewise a sacrifice, and an altar; without which,
tithes, by the law, were unsanctioned and polluted, ver. 32.
And, therefore, they were never thought of in the first
Christian times, till ceremonial altars and oblations had
been brought back.

The Jews themselves, ever since their temple was de-
stroyed, though they have rabbis, and teachers of the
law, yet pay no tithes, as having no proper Levites to whom
nor any altar upon which to hallow them; which argues
that the Jews themselves never looked on tithes as moral,
but merely ceremonial. Add, that tithes were not allowed
to the priests and Levites merely for their labour in the
tabernacle; but in consideration of this likewise, that they
were not allowed to have any other part or inheritance in
the land (ver. 20. 24.), and, by that means, for a tenth,
lost a twelfth.

Besides, it has been urged, that the priests and Levites
were properly the officers and ministers of state under God
as king of Israel: and the Israelites paying through their
hands one-tenth to him, was agreeable to the custom of
almost all nations to pay one-tenth to their king. Tithes,
therefore, are to be considered as an appendage to the
theocracy, and it has been said, that it will be extremely
difficult to prove, that Christian ministers have a divine
right to demand them, from this circumstance of a con-
stitution peculiar to the Jewish nation. As to the original
of tithes, judge Blackstone observes, that he will not put
the
TITHES.

the title of the clergy to them upon any divine right; though such a right certainly commenced, and, as he apprehends, as certainly ceased, with the Jewish theocracy; yet an honourable and competent maintenance for the ministers of the gospel is, undoubtedly, \textit{jure divino}; whatever the particular mode of that maintenance may be. Accordingly, all municipal laws have provided a liberal and decent maintenance for their national priests or clergy: ours, in particular, have established this of tithes, probably in imitation of the Jewish law; and, perhaps, considering the degenerate state of the world in general, it may be more beneficial to the English clergy to found their title on the law of the land, than upon any divine right whatsoever, unacknowledged and unsupported by temporal functions. But, however beneficial this appointment may be to the clergy, it has been complained of as impolitic in a variety of respects, and peculiarly burdensome to the state.

Mr. Smith observes (Nature and Causes of the Wealth of Nations, vol. iii.), that tithes, as well as other similar taxes on the produce of the land, are in reality taxes upon the rent, and, under the appearance of equality, are very unequal taxes; a certain portion of the produce being in different situations, equivalent to a very different portion of the rent. In some very rich lands the produce is so great, that the one-half of it is fully sufficient to replace to the farmer his capital employed in cultivation, together with the ordinary profits of farming-stock in the neighbourhood. The other half, or, what comes to the same thing, the value of the other half, he could afford to pay as rent to the landlord, if there was no tithe. But if a tenth of the produce is taken from him in the way of tithe, he must require an abatement of the fifth part of his rent, otherwise he cannot get back his capital with the ordinary profit. In this case the rent of the landlord, instead of amounting to a half, or five-tenths of the whole produce, will amount only to four-tenths of it. In poorer lands, on the contrary, the produce is sometimes so small, and the expense of cultivation so great, that it requires four-fifths of the whole produce to replace to the farmer his capital with the ordinary profit. In this case, though there was no tithe, the rent of the landlord could amount to no more than one-fifth or two-tenths of the whole produce. But if the farmer pays one-tenth of the produce in the way of tithe, he must require an equal abatement of the rent of the landlord, which will thus be reduced to one-tenth only of the whole produce. Upon the rent of rich lands, the tithe may sometimes be a tax of no more than one-fifth part, or four thirlings in the pound; whereas, upon that of poorer lands, it may sometimes be a tax of one-half, or of ten thirlings in the pound.

It is a great discouragement to the improvement of land, that a tenth part of the clear produce, without any deduction for the advanced expense of raising that produce, should be alienated from the cultivator of the land to any other person whatever. The improvements of the landlord and the cultivation of the farmer are both checked by this unequal tax upon the rent. The one cannot venture to make the most important, which are generally the most expensive improvements; nor the other to raise the most valuable, which are generally too the most expensive crops; when the church, which lays out no part of the expense, is to share so very largely in the profit. When, instead of the certain portion of the produce of land, or of the price of a certain portion, a certain sum of money is to be paid in full compensation for all tax or tithe; the tax becomes, in this case, exactly of the same nature with the land-tax of England. It neither rises nor falls with the rent of the land. It neither encourages nor discourages improvement. The tithe in the greater part of those parishes which pay what is called a modus in lieu of all other tithes, is a tax of this kind. Some have proposed, as a better method for raising a revenue for the clergy, to lay an equivalent tax upon all estates, cultivated or not cultivated. It is well known, and has often been lamented, even by the clergy themselves, that this method of raising a revenue for their subsistence, is a continual source of dispute between the clergy and their parishioners, and contributes to obstruct the usefulness of their ministry. In Holland, and some other Protestant countries, the civil magistrates have adopted what some have thought a better plan, by allowing their ministers a fixed stipend, paid out of the public funds.

In effect, for the first three hundred years after Chri$t, no mention is made in all ecclesiastical history of any such thing as tithes; though, in that time, altars and oblations had been recalled, and the church had miserably judaized in many other things. The churchmen confessedly lived all that time on free-will offerings: nor could the defect of paying tithes be owing to this, that there were wanting civil magistrates to enjoin it; since Christians, having lands, might have given out of them what they pleased; and the first Christian emperors, who did all things by advice of the bishops, supplied what was wanting to the clergy, not out of tithes, which were never proposed, but out of their own imperial revenues.

The first authority produced, setting aside all the Papistical Constitutions, which few of the patrons of the tithes will insist on, is a provincial synod at Cullen in 356, where tithes are voted to be God's rent: but before that time, divers other abuses and complaints had got ground, as altars, candles at noon, &c. And thus one complaint begat another; as it is certain that tithes suppo[e] altars.

It is not easy to ascertain the time when tithes were first introduced into this country. About the year 794, Offa, king of the Mercians, made a law, by which he gave to the church the tithes of all his kingdom, in order, as it is said, to atone for the death of Ethelbert, king of the East Angles, whom, in the preceding year, he had caused to be so benad murder: But that they were paid in England before this time, by way of offering, according to the ancient usage and decrees of the church, appears from the canons of Egbert, archbishop of York, about the year 750, and from an epistle of Boniface, archbishop of Mentz, written about the same time to Cuthbert, archbishop of Canterbury, and from the 17th canon of the general council held for the whole kingdom at Chalchth, in the year 787. But the law of Offa first gave the church a civil right to them in this land by way of property and inheritance, and enabled the clergy to recover them as their legal due, by the coercion of the civil power. However, this establishment of Offa reached no farther than to the kingdom of Mercia, over which he reigned; until Ethelwulf, about sixty years after, enlarged it for the whole realm of England. See Revenue.

Judge Blackstone says, that possibly tithes in this country were contemporary with the planting of Christianity among the Saxons, by Angulinc, the monk, about the end of the sixth century. But the first mention of them, which he has met with in any written English law, is in a constitutional decree, made in a synod held (as he says) A. D. 786, in which the payment of tithes in general is strongly enjoined. This canon or decree, which did not at first bind the laity, was effectually confirmed by two kingdoms of the heptarchy, in their
TITLES.

By the council of Lateran, held under Alexander III., in 1179, the alienation or inference of tithes is prohibited for the future: where all infeditions made since that time are generally held, by the canonists, illegal.

Some attribute the original of these impropricated tithes to Charles Martel; and hold him damned for first giving the revenues of benefices to secular nobles. But Baronius will have this to be a fable, and refers their origin to the wars in the Holy Land; which is also the opinion of Paquier.

The tribute, it seems, which the Romans imposed on all the provinces of their empire, was a tenth part of all the fruits: hence several authors observe, that the Franks, having conquered the Gauls, and finding the imposition established, they kept it on foot, and gave these titles in fee to their followers: and this, say they, was the origin of imfeffed or impropricated or appropriated tithes. But the truth is, they are not so ancient; nor do we find any mention of them before the reign of Hugh Capet; even the very council of Clermont, held in 1097, as hot as it was in the interest of the church, does not say one word of them; which yet would undoubtedly have made loud complaints of such an usurpation, had it been then known.

TITLES. "Portion of," denotes tithes which the parson of one parish hath a right to claim in the parish of another. These portions, which might probably, at least in part, have been owing to the lord of a manor's estate, extending into districts which are now apportioned into distinct parishes, are in law so distinct from the rectory, that if one who has them purchases the rectory, the portion is not extinct, but remains grantable. The cognizance of these belongs, like that of other tithes, to the ecclesiastical court.

TITLES, as "{O}ffusions to Agriculture," the impediments and hindrances which they throw in the way of the progress and improvement of the land and its cultivation and amendment. It has been said to be the infraction of natural as well as revealed religion, that a portion of our property is due for the maintenance and support of the worship of God, and that "those who serve at the altar, should live by the altar;" but that whether a special proportion of one-tenth of our yearly income from land is due to the clergy by divine and unalterable right, is a point which has been warmly agitated, and much controverted. Under the Jewish government, it is well known that tithes were distinguished to be paid by divine appointment. And it has been stated by Bishop Butler, that under the Mosaic dispensation, God himself allotted to the priests and Levites, tithes and other possessions, and that in these possessions they had a divine right; a property quite superior to all human laws, ecclesiastical as well as civil. But that every donation to the Christian church is that of a human donation, and no more; and therefore cannot give a divine right, but such a right only as must be subject, in common with all other property, to the regulation of human laws. How far the claim to tithes on the principle of divine right remains still established in Catholic countries, is not well known; but this fort of claim to tithes has long since ceased in this country. And it is remarked by a late writer, that the conduct of Henry VIII. of England, and of Charles I. of Scotland, furnishes indubitable proofs of their holding a different opinion; as those kings, on the abolition of popery, in place of transferring the tithes from the Roman Catholic clergy to their successors in office, assumed the right of granting the greatest part of them to the nobility and great laymen of the time; and in the latter kingdom in particular, with the burden only of reasonable stipends to the Protestant clergy. And further, that the grants of tithes...
TITHES.

That the farmer, when he takes a bargain of the farm kind, which is subject to tithes, will undoubtedly estimate the proportion he is to pay to the incumbent, not according to what may have been demanded twenty or thirty years ago, but what it is actually worth at the present moment; and that if, by the lenity or forbearance of the rector or vicar of his parish, he may pay less, he ought to consider it as a sacrifice of which he is often well assured, and as laying him under an obligation which he should endeavour to return by every means in his power. Were this the case, that harmony which the good of religion, and the interest of the parties require, would, it is thought, be preserved inviolate; and that none but the extortionate incumbent would be the object of deferred enmity and reproach. The writer too has seen many good effects resulting from the proprietors of tithable land becoming personally responsible to the clergyman, and letting their estates, especially when there are no leases, tithe-free. The advantage is mutual; and it prevents misunderstandings as well as an opposition of interests, which frequently arise, when the tenant and the incumbent are left to themselves.

That, upon the whole, the rights of the clergy are exacted with extreme moderation, small as many of their livings are, in most parts of this portion of the country. That no very great part of their tithes is taken in kind, in many places; yet that notwithstanding, complaints exist of the hardship of tithes from the farmer, and of the unpleasant situation in which the incumbent is sometimes placed, by trying to raise his humble benefits to two-thirds, or even one-half of its real worth. Hence, it is conceived, there must be something radically wrong in a system, which excites prejudices in the most liberal and enlightened minds, and which equally militates against the interests of religion and those of agriculture.

Having thus briefly stated the nature of the origin of tithes, and the difficulties which attend them, as they respect the clergyman and farmer, it may be proper and necessary to inquire to what uses they were applied, after a legal right to demand them had been obtained, and how far the clergy of the present day follow out in practice the principle on which they were originally made payable. It has been remarked by the writer of the work on Modern Agriculture, that in regard to the question, whether the tithes in this part of this country be now appropriated to the Uses for which they were at first paid, whether voluntarily or by compulsion? it will be necessary to go back to the first introduction of the tithing system into the country. Bede states, it is said, that about the year 597, Gregory the Great, then pope, sent a monk of the name of Autilin into England, to propagate the gospel, and to introduce a system of church-government among the people. Autilin having succeeded to the umlout of his wishes, and having received a grant of land from the then king of Kent, besides donations from private individuals, for the support of himself and the priests whom he had brought along with him, found it necessary to apply to the pope for directions in regard to the manner in which these royal and private donations should be applied. Gregory solved the monk's question, by replying, that it was the custom of the church to divide such voluntary gifts as Christians were pleased to bestow in four parts: to give one to the bishop, another to the inferior clergy, a third to the poor, and to set aside the fourth for erecting and upholding churches or places of worship. And in confirmation of this, it may be noticed, that Blackstone has remarked, that at the first establishment of parochial clergy, the tithes of the parish were distributed in a fourfold division: one for the use of the bishop, another
Tithes.

for maintaining the fabric of the church, a third for the poor, and the fourth to provide for the incumbent; but that when the fees of the bishops became otherwise amply endowed, the bishops were prohibited from demanding their usual share of the tithes, and the division was in three parts only. In considering the state of tithes in the fourteenth century, he likewise takes notice of an act of Richard II. enjoining the bishops to allocate a proper sum out of the tithes of each diocese, for the fullness of poor parishes; remarking, in addition, that it seems the people were frequently sufferers by withholding of those alms, for which, among other purposes, the payment of tithes was originally imposed.

The first of the above two writers observes farther, that at what period the superior clergy of England first possessed themselves of the tithes, in defiance of the original designation, and of many statutes made to enforce an application of them to the uses for which they were first made payable, it is unnecessary to inquire. It will not be denied, however, it is thought, by the keenest flicker for the prerogatives of the church, that in place of one-third of them being applied for the use of the officiating clergy, one-third for the support of the poor, and the remaining third for the repairs of the churches, which, when the bishops had acquired land in mortmain, or free alms, sufficient to support their dignity, was the designation originally intended; the tithes payable in England are now very differently, although not, it is said, so legally, appropriated. Those people, says the writer, who are most disposed to cry out "the church is in danger," when the real or supposed rights of the clergy are invaded by the flighty attempts to alienate the tithes, ought to reflect that the third of all the tithes in England, whether in possession of the church or of the laity, ought to be allowed for the support of the poor; that another third ought to be expended in the repairs of the churches, the expense of which is now defrayed, in almost every instance, by an allowance on the parishes; and that the last third ought to fall to the officiating clergy, many of whom are the most miserable of the sons of men.

But it is not by any means, is it said, intended to censure the present members of the church of England for alienations of rights that took place centuries ago; far less to intone that that respectable body have not an unquestionable right to the value of such a proportion of the produce of the soil, as will enable them to fill the stations in which they are placed with dignity and honour. The object which is here aimed at, is the giving a succinct account of the particulars and circumstances in which the payment of tithes in kind operates against the introduction of improvements in agriculture, and the advancement of religion; and by throwing the reader back to the era in which the alteration in the tithing system was effected in Scotland, to endeavour to point out a way in which the future payment of tithes in England may be arranged, so as to meet the purposes, and most effectually promote the interests of agriculture, without in the smallest degree infringing on the rights of the individuals concerned in paying or receiving them. There are many different ways in which the payment of tithes in kind operates unfavourably to the general advancement and prosperity of the husbandry of this country. According to the writer of the Essays on rural affairs, it is universally considered as a grievance; there being, it is said, fearlessly an agricultural survey of a county, in which it is not stated as an evil that ought to be removed. And this the author thinks no wonder, as the drawing of tithes in kind, when it is examined with attention, will be found to operate directly, in the strictest sense of the word, as a tax on industry; and to be, at the same time, more vexatious in the mode of collecting than perhaps any tax that has ever been adopted, or had recourse to, on any occasion.

It is conceived to be a measure that has an injurious and unfavourable effect on four different descriptions of society, as the farmer, the landlord, the clergyman or proprietor of the tithes, and the public.

As to the first, or the farmer, he is more or less affected, according to the differences of the nature, circumstances, and situation of the land which he may hold. The intelligent writer on Modern Agriculture, noticed above, considers it unfortunate, though certainly the case, that the payment of tithes in kind operates more against the spirited improver than against the slovenly and indolent; and that tithes, as the law now stands, cannot be considered so much the tenth of the natural produce of the soil, as a tenth of the capital employed by the farmer in its cultivation and improvement. For instance, if a farmer pays his ploughman ten pounds a year of wages, his labourer ten-pence a day for his labour, or the landlord a hundred pounds of rent, he must consider himself as advancing one-tenth part of those sums for the purpose of promoting the interest of the tith-ower, who not only receives annually a sum equivalent to the tenth part of this capital, but that tenth improved to the highest degree which the unremittent exertion of the tenant is able to effect. Mr. Locke, it is continued, in his Treatise on Civil Government, remarks, that it is labour which puts the greatest part of the value upon land, without which it would scarcely be worth any thing. That is to say, that we owe the greatest part of all its useful products; for all that the produce of an acre of wheat is more than the produce of an acre of as good land which lies waste, is the effect of labour. Hence, it is thought, the farmer furnishes a fund to purchase the necessary labour, whereby an acre of land is rendered more productive as to afford fix, or eight, or ten shillings yearly of clear revenue to the tithe-owner, which, but for the application of that labour, would have remained unproductive for ever, in so far at least as he was concerned. So much is this the case, it is said, that if a farmer expends one hundred pounds on the purchase of manure, the improvement and cultivation of his farm, and the payment of the rent; and if the value of the crop, when sold, amounts to one hundred and ten pounds, he is actually a loser to the extent of five pounds, or what may be the interest of one hundred pounds for a year. He indeed gets his capital of one hundred pounds returned, but the tithe-owner draws the ten pounds, or rather more, or, which is the same thing, the value; so that the farmer has employed his capital to enable the tithe-owner to draw a dividend of 10 per cent., on that capital, whereas had he lent it in mortgage, or placed it in the funds, he would have benefited himself and his family to the extent of the interest or the dividend which he, in either of these cases, would have himself received. So much, it is said, for the arbitrancy of attempting to improve lands under such circumstances. The able writer of the above named Essays likewise, after stating different ways in which tithes operate against the village or tenant-farmer, truly remarks, that in this country, besides commons and wastes, much very fine land is allowed to remain in grass in a very unproductive state, which, with a little or moderate degree of industry and outlay of money upon it, might be made to yield abundant crops of corn; and the reason assigned for this disgraceful state of management and want of production, which is so called, because, was it altered, even the grafs-land might be safely made twice as productive
TITHES.

ive as it is by a judicious use of the plough, is, that the title of corn-land is so very heavy, as deters the farmer from having recourse to the plough; whereas in Scotland, where the corn-tithe is never drawn in kind, immense tracts of country, which thirty years ago were covered with heath, and totally unproductive even of grass itself, are now converted into fertile fields that yield abundant crops of corn and grasses; and which, if the tithe-laws had there existed, must, in all probability, have continued unproductive until the end of time. This is a contrast that is very striking to every one, it is said, who travels through these parts of that country; and that it brings forward a practical fact, which, ought, it is thought, to outweigh a million of speculative arguments.

The intelligent author of the Present State of Husbandry in Great Britain states, that another grievance to which farmers are subjected, in the payment of tithes in kind, arises from the harsh and oppressive manner in which the payments are sometimes exacted. The nature and extent of this grievance may, it is said, be learned by a perusal of the extract which is given below, from the same writer's Agricultural Report of the County of Northampton; where it is stated, that it has happened, (though, to the credit of the tithe-owners be it said, the infinences are very few or rare,) where, when the tithes have been let for the purpose of oppression, the tithing-man has been known to exert that authority with which he was invested; that he has not only taken the tenth fluck of corn, and the tenth cole of hay, but also the tenth lamb, pig, hen, egg, &c. nay, has even gone into the garden, and taken not only the tenth part of the fruit, but likewise the tenth of the produce of the kitchen-garden. Under such circumstances as these, it may be asked, who is the farmer that would not feel himself aggrieved? From this it must appear, it is thought, obvious, that whether the farmer's interest or happiness be considered, it must be equally his desire that some arrangement should be effected, whereby the payment of tithes in kind should for ever be abolished; for, as the writer of the Agricultural Report of the County of Buckingham very justly, it is said, observes, it may be laid down as a proposition, that whatever profit arises to the cultivator of the soil, by the force of superior ingenuity and industry, should be held sacred by the church and government. If it be otherwise, it discourages the improvement of the soil; and thereby the church prevents the future increase of her tithes, and the government the future increase of its taxes. It has been ably contended by the writer of the Essays on rural subjects, already noticed, that though the tithe-laws are hurtful to the farmer, they are perhaps still more to the proprietor or land-holder. Whatever checks, it is said, the industry of the farmer, must, in a direct manner, diminish the income of the landlord; and as the energy of a farmer, when once excited, is well known to augment in proportion to the advances he has made, whatever checks that energy in the bud, occasions in time a diminution of income to the proprietor, much greater than can be easily conceived. And that, as it is supposed the proportion of rent which can be afforded for arable land, increases with the productivity of that land in a much higher degree than in the ratio of the quantum of the crop; whatever tends to render land permanently more productive than before, if no deduction be made from it, tends, at the same time, to augment the income of the proprietor in a still higher degree than that of its produce. But as it is obvious that the tithe operates as a dead bar to the commencement of improvements in agriculture upon any soil of no great degree of fertility, so as to prevent the beginning of that motion, from the acceleration of which alone the proprietor can hope to derive considerable increase of rent; in all cases his rent is diminished in a much higher ratio than one-tenth, as it might seem to do by those who take only a flight view of the matter. It is added, that should the proprietor of poor lands, seeing the impossibility of the tenant's improving them, attempt to render these more permanently fertile by the outlay of flock upon them, that he never expected to draw back: but would content himself with a reasonable return of interest on the capital in the name of rent, he would not find the cafe much altered. He lets out, it may be supposed, with this principle, that if he can secure a permanent rent, equal to 5 per cent. on the money expended upon them, he will be very well satisfied with it. Let us say, then, that twelve bushels of grain were the next expense of culture, &c. which, on an average of all sorts of corn, was valued at 4s. the bushel; and that he had expended 2s. the acre, the interest of which, at 5 per cent., is 2s. or in other words, five bushels. But that before he can draw this rent free of tithe, the average produce must be, at least, eighteen bushels, out of which must be taken one bushel and nine-tenths, so that instead of five, his rent will be reduced to 3 per cent. nearly; while the titho-owner will be entitled to draw nearly 2 per cent. for ever, on the capital which the improver had thus expended. It is almost needless to add, it is said, that under such circumstances it is vain to look for a general spirit of agriculture, either among proprietors or tenants, to both of which descriptions of persons the operation of the tithe-laws are, it is contended, highly oppressive.

And another instance is stated of very material importance, in which tithe becomes singularly pernicious and prejudicial to proprietors of land. The importance of keeping and preferring the whole produce of the ground upon the farm where it was raised, for the purpose of making manure, seems, it is said, to be very generally understood; as a clause to that effect is universally found inserted in the leases in every county of England, wherever leases are granted at all. What punishment, it is asked, would the proprietors of these lands deem adequate to the crime of selling off the whole produce of the farm every tenth year? Yet great as this crime would be, it would not be adequate, in point of damage to them, to the right of drawing tithe in kind from their arable lands; because the farmer who sold the produce would, at least, become possessed of money to replace, in some degree, by means of extraneous manures, the loss he had incurred by the abstraction of the home-dung. Those who are entitled to draw the tithe in kind are, in fact, by this means, vested with a power of enriching themselves, or their own private property, if they be so inclined, at the expense of every other proprietor around them. In this point of view, therefore, tithes are singularly pernicious to proprietors of land. This is unquestionably an objection to the drawing of tithes in kind that can probably never be well got over by any of those who are so favourable to the present tithe system. It strikes at the very vitals of all our improvements in husbandry and rural buisnesses.

Besides, the writer of the work on modern husbandry considers that inasmuch as the spirit of improvement is depressed and checked, the land-holder must be injured; and that as there are no regulations or laws existing in this country which have such a tendency to impede the introduction of new or improved modes of husbandry as those of exacting the payment of tithes in kind, there are, of course, none that operate so decidedly against the landed interest of the kingdom. If, it is said, the farmer be restrained from including, draining, purchasing manure, in short, from cultivating...
TITHES.

Among the farmers in every age and country, the proprietors and farmers, in consequence of the success of the improvements which in that event would be undertaken, would be enabled to purchase more of the manufactures of the country, pay a greater share of the taxes for the support of the state, and after all, live in a greater state of ease and comfort, than under the existing circumstances they are able to do. In short, it is considered that the abolition of these laws is the only measure that can be adopted with any probability of success, at least the first one that ought to be attended to, with a view of again bringing the corn-trade to turn once more in favour of this country. When all these various circumstances are conjoint; and when it is further considered that, except in Spain and Portugal, there is scarcely a civilized nation in the world where this system of church-slavery is allowed to exist; and that even in Russia tithes are abolished; it may be reasonably hoped that the period is not far distant when England will be relieved by legal and constitutional means, and in consequence of arrangements made on liberal principles, from this almost Egyptian boudage.

It further likewise appears, from the accounts given by different writers on the subject of tithes, that they were paid in the latter end and ages of the Romish church with great reluctance; and even in this country during the reign of Henry VIII. Therefore it is said, that if, when improvements in agriculture were in their infancy, and at a period too when men's minds were held in flavish servitude by the clergy, the payment of tithes in kind could hardly be enforced, can it be supposed wonderful, that in those enlightened days it should be considered as a grievance? At a period when the principles of religion and of real genuine liberty are better ascertained, and more generally known, than in any former age, it is not surprizing that laws compelling the payment of tithes in kind, laws which originated in edicts issued by bigotted kings under the influence of designing priests, should now be found inimical to the best interests of the country, and to the happiness of so many thousands. That this is the case, every inhabitant of this island has ample opportunities of satisfying himself by a perusal of the agricultural reports of the different counties of England and Wales, which have been lately-published. And that as these reports, after having been circulated among the proprietors of land and farmers for their correction and amendment, still contain, in their republication, the same or similar complaints in respect to the hardships which the farmers are subjected to, and the injury which agriculture sustains, by the continuance of the payment of tithes in kind, such complaints may justly be deemed the voice of the people proclaimed in a constitutional way; and as such, merit the most serious and speedy attention of the Legislature and of the clergy.

A few of the injurious effects of the practice of paying tithes in kind have been noticed above, and many more of the hardships proceeding from it are recorded in the different agricultural county surveys and other works which have been only slightly touched upon in what has been already said upon the subject. And the necessity of something effectual being done, in order to the removal of so inconvenient and oppressive a regulation, has been strongly thrown in the writings of the various advocates of the improvements of British husbandry and farming, as well as by many other able and intelligent writers on matters connected with them, but which, for want of room, cannot be considered here.

As, therefore, some reform in the mode of paying tithes in this country must be admitted to be indispensably necessary,
TITHES.

fary, it is to be wished that the legislature, especially at the present time, would devote that attention and consideration to the subject which its importance and necessity demand, and the clergy come forward with such reasonable propositions for the adjustment of the business as may be suitable, as by such means the matter might, and no doubt would, be soon easily settled to the satisfaction of all the parties concerned.

In the view of affording a proper knowledge of the most suitable means of effecting so important an alteration, the author of the "Prefent State of Husbandry" in this island, gives the following clear account of the beneficial arrangement which took place in respect to tithes in Scotland, and of the circumstances which led to it. It is stated, on the authority of Erkine's "Institutes of the Law of Scotland," that the payment of tithes in kind was continued for many ages in that kingdom; and that, owing to the precariousness of the climate, it was attended with more grievous hardships than could have taken place in the southern part of the island. Every Scotch proprietor or farmer, who presumed, after reaping their corns, to carry off any part of them from the field, until the person having right to the tithe had drawn his share, were, from the first establishment of this right, subject to severe penalties. The tithe-owner, on the contrary, either from indulgence, or desire to oppress, or with a view of compelling the proprietor or farmer to purchase his tithes annually at a high price, frequently delayed drawing his share until a great part of the crop or produce was rotten. Notwithstanding several statutes were enacted with a view of checking the oppressive disposition which so often evinced itself in the conduct of the clergy in this respect, yet these grievances continued to exist, or were, at least, until the year 1633: when a decree-arbitrary, passed by Charles I. in 1629, for arranging and determining a mode, to be afterwards adopted, for the payment of tithes, was ratified by parliament.

That during the struggle for the establishment of this or that form of church-government, great alterations had taken place, both in regard to those having right to the tithes, and to the manner in which they were exacted. On the Reformation, the benefices of the church fell to the crown, and were, at different periods, gifted for services, or other considerations; such as for supporting universities, hospitals, &c.; and the persons obtaining them were denominates lords of erection, and sometimes called by other names. They likewise got, or assumed, the right of nominating officiating clergy on all vacancies. These alienations were, by act of parliament, 1587, put a stop to; and such tithes as had not been previously dispossessed, remained with the crown unalienably. The tithes, which were then annexed to the crown, may be valued and leased by the proprietor of the lands, but cannot be purchased. The officers of the crown are in use to grant leaves of this description of tithes for nineteen years, and which are renewed as matters of course on paying a reasonable sum on such renewal. The sum demanded is regulated by the yearly value of the tithes; so that a capital equal to between five and six years' amount of the tithes, laid out at the commencement of the lease, and improved by compound interest, is sufficient to produce such a sum at the expiry as will obtain renewals to perpetuity.

Some of the clergy remained, it is said, in possession of their benefices after the Reformation; and the vacancies that happened in such benefices were filled up by those who assumed the right of presentation. An act of parliament was soon afterwards passed, whereby the patrons were deprived of the right of patronage: but in compensation for this supposed hardship, it was enacted, that the right of all tithes, to be paid by the clergy, should be vested in those who had exercised the right of patronage. Patrons having acquired tithes in this way, are compelled by law to sell them at nine years' purchase of the yearly value of the tithes.

The system of tithes and titling having, however, got into great confusion, in consequence of the various alterations that took place in the government of the church of Scotland, those interested found it necessary to submit their several rights and claims to the determination and final award of Charles I., who, on the 2d of September, 1629, pronounced two decrees-arbitrary, or judgments, which laid the foundation of that arrangement respecting tithes, and the payment of the established clergy in Scotland, which has been productive of so many good consequences.

The most important article in these two decrees-arbitrary, is that which directs the valuation and sale of tithes; after which, the land-holder is entitled to the whole crop upon payment to the proprietor of the tithes of a yearly rent, or to purchase them at an easy rate, subject to a reasonable provision to the clergy. The officers of the crown, by this law, are, it is said, that 'the rule of all tithes, where they are valued jointly with the stock, shall be a fifth part of the constant yearly rent that is paid for the lands.' Another material circumstance in the valuation of tithes in Scotland is, that the rents of mills, those arising from recent improvements, and some others of lesser importance, are deducted from the gross amount.

By these decrees, which were ratified in parliament in 1633, the proprietors of land not having right to the tithes, were not only found entitled to sue the titular in an action at law to ascertain their value, but, unless vested in the crown, to obtain a purchase of them on established terms, as mentioned above. Thus, ever since 1633, every land-holder in Scotland has had it in his power to acquire right to his own tithes, either by purchase, or lease, so that they should be no longer payable in kind. Nevertheless, those who neglect to sue for a valuation may still be subjected to all the inconveniences of the former law; as under such circumstances, those having right to the tithes may draw them in the manner commonly practised in England. The remedy is, however, so easy, that it must be a fool indeed who would subject himself or his tenants to such a flavius fervitude, while he has it in his power, by a simple application to the supreme court of the country, to abolish it for ever.

Some instances are, however, recollected, where proprietors in the north of Scotland, having a right to the tithes, and being unwilling to forego all the power of harassing their tenants, which attached itself to the ancient feudal baron, still continued to draw the tithes for some time. But they at last became ashamed of such conduct; and there is not now, it is said, one instance where tithes are paid in kind, or where the tenants have any concern, either directly or indirectly, with or in the payment of tithes on the north side of the Tweed. How then, it may be asked, are the Scotch clergy provided for? The answer is, it is paid, easy; the stipends provided by law for the maintenance of the Scotch clergy are still payable out of the tithes. The judges of the court of session, who act as commissioners for the arrangement of tithes, have a right to modify reasonable stipends to the parochial clergy. And accordingly, in all such cases, where the clergyman can shew that the parson is a place of more than ordinary reformatory use, that the cure is burdensome, or that the necessaries of life give a high price in that part of the country, or that the scanty
TITHES.

fealty allowance of stipend in that parish bears too small a proportion to the weight of the charge, provided there are free and unappropriated tithes in the parish, the commissioners, on the application of the clergyman, grant an additional stipend, either in money, but more generally, where practicable, in grain, as being least fluctuating in value than money. But that owing to the free tithe in the parish having been previously assigned to the clergyman, some instances do occur, where the commissioners have it not in their power to augment his stipend, although it be too small for the decent maintenance of a numerous family. In all such cases it would, it is thought, be highly proper to apply part of the bishop's tithes, such as are now payable to the crown, to the purpose of rendering the situation of these clergymen, who are so unfortunately situated, more decent and respectable.

In order to the introduction of a suitable arrangement in regard to tithes in this part of the country, it is remarked, that the question has been for some time past very popular, and much agitated; and that many difficulties have been started, apparently for the purpose of rendering it more perplexed and complicated than it is in reality. Holding it as a sacred and inviolable principle, that tithes, as now payable in England, were formerly appropriated for particular purposes, and that although in many instances alienations were made at different periods; yet that as these are expressly or virtually confirmed by those laws which protect national and individual property; therefore tithes, as now payable in the southern part of the island, are payable in conformity to the laws of the country. This being granted, no man who has a regard for justice, who venerates the constitution, or who would not wish to see the rights of property invaded, but must be satisfied, that if the present mode of paying tithes is abolished, the clergy and the lay-proprietors of tithes are, in law, justice, and equity, entitled to an equivalent. What that equivalent ought to be, and in what manner ascertain'd, becomes the question. It is observed, that it is not by appeals to quarter-seessions, nor by special acts of parliament for this or that particular diocese or parish, that this great national question can be determined with propriety; it is only by a submision of all rights and claims of both parties to the determination of some one respectable individual, that the matter can be amicably or equitably decided. And it is thought, that the most proper individual to be made choice of is the sovereign, or person holding the government of the country.

The clergy, it is said, need not be afraid to appeal to such an arbiter, as in the course of a great length of time there has been no instance of any degree of infringement of or upon their rights. The land-holders and lay tithe-owners may keep their minds at ease, as though the most sacred regard for religion has been evinc'd, yet it has been divested of superstitition or bigotry. If, it is continued, Charles I. during the anarchy of church-government that prevailed in his time, found no difficulty in passing a decree in a similar case, which, having received the sanction of parliament as a matter of course, laid the foundation for a just and equitable arrangement of the tithes, the business may unquestionably be accomplished with much less difficulty at the present period. The probable consequences of such a submision would, it is thought, be, that the arbiter would no doubt appoint commissioners to examine and ascertain the yearly value of all the landed property in England, the produce of which is subject to the payment of tithes. Were the yearly value of the lands ascertained by a corn-rent in place of one in money, and which, it is supposed, might be easily done by taking the average price of corn for the seven or ten years or more last past, with the exception, however, of 1795, and some other fewer and dearer years, the clergy could claim no loss, nor would after valuations in consequence of the depreciation in the value of money, be rendered necessary.

This being done, a fifth, a sixth, or any other given proportion of the free rent, after the payment of parliamentary taxes affectting land, would be declared due to the tithe-owner in lieu of the payment of tithes in kind. This clause of the decree would probably, it is thought, be, to compel every lay-owner of tithes to sell his right to the land-holder, at a fair and equitable, but regulated price; and another would most likely be, declaring the clergy entitled for ever to a fifth or sixth, or some other determinate proportion of the present real free rent of all titheable lands, to which they may have right, and subjecting the proprietors to the regular payment thereof. Thus at once would, it is said, a load which has for many ages press'd down the spirit of the English farmers, be removed, and that while all ranks and degrees must applaud the equity and the propriety of the arrangement, a spirit for agricultural improvements would evince itself superior, it is thought, to any of which the records of this country make mention.

It is supposed that this mode is the less exceptionable, as it is almost similar to that adopted when acts of parliament are passed for enclosing particular parishes. At the first meeting of the commissioners named in such acts, they direct, that all having interest may deliver in their claims, and the rights or grounds on which they claim, against a certain day. Thrice being afterwards examined by the commissioners, who are neither more nor less than arbitrers appointed by the legislature, their decision constitutes the law in regard to the right by which the individual proprietors hold the lands, which by the arbiter's award is assigned to them. In place, therefore, of multiplying acts of parliament respecting the adjustment of tithes ad infinitum, one only, and that a very short one, seems necessary, authorizing the governing person to arbitrate between the owners of the tithes and the land-holders; and whose award, like that of the commissioners appointed under acts of parliament for enclosores, should be final, and have the effect of law. Having thus laid down the general principle, it will not be expected that any attempt will be made to combat the little difficulties that may be started against the practicability of carrying the measures founded thereon into effect. These the wisdom of the arbitrator will be fully sufficient to obviate and direct. One thing is certain, it is supposed, namely, that a decree-arbitral or judgment, pronounced by such high authority, and founded on these principles, would give universal satisfaction to every party concerned.

On a matter which is so very interesting and important to the English land-holder and farmer, it will be necessary and useful to bring to the inquirer's notice and attention a few of the different other modes and plans which have been suggested at different times by different writers for effecting the business and adjustment of the matter of tithes.

The intelligent writer of the Essays on rural affairs has supposed, that the tithes of or in England and Wales should be converted, so as to make a payment in money be universally received in lieu of the payments in kind that are at present exigible; but under such modifications as to prevent the possibility of those who are entitled to draw the tithes from suffering by the depreciation in the value of money, which we have seen for a long time past has been going on in a regular progression; and which may be expected to continue; or may, perhaps, as at this time in a neighbouring country, be sunk almost to nothing by some political shock that
TITHE.

that cannot at present be foreseen. With these views, might not, it is asked, a law be obtained, authorizing the valuation of tithes, in every case where either of the parties interested in it should so incline? This might be done, it is said, by a
famous raised against all the parties concerned, either before the sheriff of the county where the property lay, or before any other judge that should be thought more proper for executing the office; who, after hearing the parties, should proceed to make a legal inquest to obtain a clear proof that what had been the amount of the tithes, actually paid and drawn, for five, ten, fifteen, or twenty years past, as should be judged the most proper, out of the several lands in question; specifying distinctly the quantity of each denomination of grain, or other titheable produce. But as it may easily be foreseen, that it would be a matter of great difficulty, in many cases, to get at these facts with precision, might it not be put in the power of the judge, if the parties could not agree as to that particular, to appoint two or more persons of good character in the neighbourhood, to gather up the tithes in kind themselves, fairly and honestly, for five years next to come, without favour to any person; the amount to be delivered to the persons having a right to receive them, after the quantities had been respectively ascertained, so as to admit of the collectors making up an account of the whole, upon oath, to be delivered to the judge; who, from that account so made up, should caue an average to be struck of the quantities of each particular article; which average quantities, after deducting a just proportion for the expense of collecting, and taxes affecting the tithe, should be declared by him to be the legal tithe exigeable from the land in question in all time to come? But as there is room to suspect that the money prices of corn, wool, &c. of different denominations, may rise to be much higher in some future period than it was at that time; instead of then ascertaining the amount of these articles, let it be declared, that the quantities of grain and other articles resulting from the averages respectively, are payable out of the respective lands, leaving the average prices of such grain, wool, &c. to be settled and ascertained each year, as is specified below; declaring that the money which shall arise from the average prices thus ascertained, should be in lieu of the whole tithe that could be exacted each year; the time of payment too to be specified. And, in order to prevent all disputes as to the average prices of these articles in time to come, let the sheriff of each county be authorized and required to make an inquest at a certain period each year of what has been the actual ready money selling price of corn of the preceding year's crop, from the time the crops were reaped till this time, and of wool, as well as of all other titheable articles for the former year, by examining witnesses before a jury to be appointed for that purpose, which prices, after being thus ascertained, should be published and declared to be those by which the quantity of tithe-corn of each particular description, and other titheable articles, contained in any degree of valuation, should be payable for the crop of the preceding year. Thus, it is said, would the tithe-owner be entitled to receive payment of his tithes, without any extraordinary expense or trouble, or unjust deduction or dispute whatever; the farmer would be allowed to carry on his operations uncumbered by those galling restraints which the tithe-laws at present perpetually threw in his way: the proprietor would be at liberty to apply such part of his capital as he might incline, towards promoting agricultural improvements, with a reasonable prospect of being benefited by his exertion: and the public would become possessed of a quantity of surplus produce of land, which it can have no prospect of ever otherwise enjoy, which would be the means of diffusing a perpetual plenty through every corner of the land.

Mr. Pitt, in his account of the agriculture of a midland district, suggests, that the mode or scheme to be adopted as the outline of an exchange of tithes, should be for land, in the manner directed below, as land will always bear a value proportionate to that of its produce, and that even the price or value of labour is measured by the same standard. This is, that an act of parliament should appoint, in every diocese, an equal number of the most respectable clergy and country gentlemen commissioners and trustees, with a power of nominating surveyors, to value all the tithes belonging either to the clergy or laity within the diocese; and that this act should be let give an option to the land-owners of purchasing their respective tithes, at the valuation fixed on them by such commissioners and surveyors; the money arising from such redemption being invested in the funds, or other more proper securities, until a suitable opportunity should offer of laying it out in the purchase of land; and that, where the land-owners should refuse to purchase such tithes, the commissioners should have the power of mortgaging them, or of taking up money on their security, to be invested in the same way with that arising from the tithes actually sold; or after a given time, the trustees might be empowered to let part an allotment of the land of those owners who refuse to purchase, and which, if conveniently situate for the former tithe-owner, might be so applied, otherwise sold; and the money arising from such sale invested as before, until it could be laid out in the purchase of land. The execution of this plan or mode as this would, it is supposed, be attended with infinitely less trouble and expense than now incurred by the annual valuation of tithes; as, should such a regulation be once effected, the business would be settled for ever: while under the present system, the surveyor or valuer's business is never done, but continued from year to year; and, if it should remain, will be from generation to generation. An equivalent in land must certainly, it is thought, be a more solid property than tithes. Land too may be improved in any degree by good management and industry: tithes fluctuate or link in value at the will of the cultivator. Some such commutation as this may, it is thought, be readily and easily effected, and that all parties would be pleased with the alteration.

The concluding remarks and suggestions on this greatly interesting matter, are the result of the investigations and inquiries of two clergy-men, who have been lately engaged in drawing up accounts of the state of the agriculture of two large counties of the kingdom, those of Hereford and Berks. The former states, that of the various modes proposed to effect the desirable object of a general commutation of tithes, that of a corn-rent seems to have met less objection than most others which have been yet proposed; still, however, nothing has been seriously attempted, and the matter remains open to further discussion. It has not, perhaps, if it is said, occurred to every one, that tithes, in their present form, have a direct and powerful tendency towards increasing the prices of wheat and of every other grain, by creating obstacles to its culture, and thus diminishing the quantity which would otherwise be grown. But that the fact, that an acre of land under the culture of wheat is liable to a deduction on account of tithes, is nearly ten-fold proportion to the amount of that acre of land grazed by cattle or sheep, is surely sufficient evidence that tithes must operate unfavourably to the culture of grain, and consequently to its abundance and cheapness. How desirable then is it, it is said, such a commutation as would render this payment equally heavy on every acre of land, according to its value, whether
TITHES.

It be applied to the culture of grain, or to the production of animal food. Under this impression it is here proposed, that in lieu of title, a tax be imposed, on the principle of an equal land-tax, upon every estate, according to its value, for the support of the clergy. The wisdom of parliament would, it is supposed, easily determine how many thillings in every pound of rent would be equal to the revenues to which the clergy have a claim, and that the measure would be greatly facilitated by the investigations occasioned by the income or property act lately in force. The tenant might be made liable in the first instance to the payment of the duty proposed as a substution for the tithe, but in case of his defalcation, the landlord might be made ultimately responsible.

In this mode of arrangement, the clergy, it is supposed, would receive what is their due, a full equivalent for tithes in its present state; the securitv would still attach to the soil itself, and their revenues would still increase with the increase of the value of land and its produce. Encouragement would thus be afforded to increase the culture of grain; the industrious farmer would not have to contribute more than is just proportion; the tithe-owners too would obtain the fair value of their property; the clergy of the church of England would acquire that degree of respect and esteem to which few will deny that they are, in the aggregate, entitled; and, above all, they would be enabled to fulfil the valuable purpose of their institution: while at present, the clergyman who demands but the fair value of his property, becomes hated, and often insulted; and, to use the strong language of some, his “integrity becomes suspected; his every action is seen through a falle medium; and the pastor is lost in the collector of tithes.”

If it should be objected, that under this or any other mode of commutation, the farmer would not eventually be benefited, because the landlord would then receive what is now paid to the tithe-owner; and that the farmer has no just ground of complaint, as he engaged his farm subject to the deduction or payment of tithes: let it be understood that the interest of the community at large, not of any one branch of it, is here contended for.

The writer maintains, that the great object of a commutation of tithes, beyond a religious view of it, is the relief of the corn-field, and not the farmer. Perhaps, it is said, if the subject be well considered, the farmer would gain less in a commutation than any one class of society. Tithes, in their present form, may check his improvements, may contract his system of farming and his capital, may harass his mind, and lead to personal animosities and expensive litigations; but probably his mere payments in lieu of tithe would, on the whole, be as heavy under any commutation, as thence to which he is now liable. The public, it is said, must give that price for grain, at which it will answer the farmer to raise it; and that supposing it possible that the farmers throughout the island were to engage in a combination, to convert so much of their present tillage into pasture, as would leave only half the usual number of acres under corn, the inevitable consequence would be, that grain would fall at an enormous price, and the farmer would receive that increased price, at a time when his expenses were diminished in the proportion of his tillage. Thus the consumer, which is the public, and not the farmer, would suffer; and if a tax, such as tithes, added to the increased price of timber, iron-work, and labour, should induce the farmer gradually but materially to contract his tillage, there could be no hope that grain would be sold during any considerable period at a moderate price; nor could there be an adequate supply for the wants of the country, without the aid of large importations, which are always precarious, and sometimes impossible: and as animal food invariably rises in value with the increased value of grain, the farmer might thus be enriched at the expense of every other branch of the community. The plan or mode here proposed for a commutation would, it is presumed, counteract or prevent these furious evils; encouragement would be given to an extended culture of grain; and a new motive to industry and exertion would be found in the consideration, that the most industrious farmer must contribute an equal sum with the most active and successful cultivator.

The latter of these clergymen thinks, that in regard to tithes in secular hands, though the church may suffer in the amount of its income, it derives a considerable degree of security for what it still possesses, from this very circumstance; and consequently only touches on the subject so far as to propose that they should be commuted for land, according to their value. To this no reasonable objection is seen, or any insuperable difficulty, if a legislative plan were once chalked out for its accomplishment. But as for tithes in the hands of the clergy, whether great or small, it is supposed they might be beneficially commuted, by first taking their fair valuation by two competent sworn commissioners, one of whom should be named by the incumbent, and thus fixing a sum to be paid according to the combined prices of corn, meat, as mutton and beef, and milk, to be taken on the average of the seven preceding years, and to vary with the times every subsequent seven years. And in order to prevent any thing personal between the incumbent and his parishioners, except in the duties of his vocation, the overseers and churchwardens to be made the responsible agents in collecting and paying the sum to be raised, with certain provisions and securities against misapplication and loss.

A corn-rent alone is, it is said, found to be an inadequate mode of commutation; but that taking the three great articles of life in every family, bread, meat, and milk, the clergymen would be secure from injury, and the farmer, paying only in proportion to the value of his produce, would have no reason to complain. It is to be observed, however, that it is wished for the laws to act uniformly for the benefit and security of the parochial minister, without subjugating him to the necessity of coming forward in a personal and partial light. By these means, what he might lose in the influence of fear, would, it is thought, be amply compensated for on the principle of love; without which he can seldom be happy himself, or discharge the duties of his sacred office with effect and satisfaction.

Where lands have been exonerated from tithes by an act of parliament, and an allotment made in land in lieu of them, even where an adequate value has been given, which in no instance that has fallen under the writer's notice is, it is said, really the case, it is throwing too much land into mortmain, it is subjugating the incumbent to all the cares and incumbrances of landed property, and driving him to the necessity of becoming a farmer, for which he is often ill qualified, or of letting lands, according to the existing laws, on such conditions, that improvement must be checked, and industry languish.

In order, however, to obviate some of the evils resulting from a practice that has already, it is said, become too general, it is proposed, that after having reserved a sufficient glebe, which in every instance should be done, with a due regard to the value of the living, the incumbent should be allowed to lease the remainder, at the full value, with the consent of the patron and the bishop, on a running lease, determinable every three or seven years, at the option of either of the two principal contracting parties. A new incumbent
cumbent would thus, it is suppos'd, without waiting too long, have an opportunity of improving his property, if he thought it capable of being so; and the tenant, having a fair prospect of occupying the land under any change, would feel himself equally fate in making improvements, as if he rented of a layman. All dilapidations and repairs on the farm, however, should fall on the tenant; who ought not to be bound in proper covenants, but be obliged to give due security for their performance, as well as the payment of the rent.

Or, to land belonging to the clergy, the corn, meat, and mule rents might, it is said, be applied as well as to tithes with leaves for twenty-one years certain, which would probably be the most eligible mode, as it would give uniformity to the plan of clerical provision, and would always afford an income according to the times.

Upon the whole consideration of the subject, there cannot be any doubt but that great advantage and improvement would arise to agriculture, from some measure of this nature being laid recours to and carried into execution; and though the farmer might not perhaps, on the whole, experience any great diminution in the quantity of money which he would have to pay, he would be wholly freed from the anxiety, trouble, and vexation, which constantly attend the taking of tithes in kind, and at the same time, which is much more important and material, be left at full liberty to exert his utmost endeavours to promote all kinds of improvements, which the nature of his farm may with propriety admit. And in this way, and by such means, the art of agriculture would be carried forward to such a state of improvement and perfection as cannot be easily conceived. Besides, such a measure might have a considerable effect in promoting the inclosure and cultivation of much land still in the disgraceful situation of waste, all which are desirable objects on various accounts in the present state of the country.

Tithe-Rate. See Rate-Tithe.

Tithes, Subtraction of. See Subtraction.

Tithing, Decenna, or Decury, a number or company of ten men, with their families, knit together in a kind of society, and all bound to the king, for the peaceable behaviour of each other.

Anciently no man was suffered to abide in England above forty days, unleas he were enrolled in some tithing. One of the principal inhabitants of the tithing is annually appointed to preside over the rest, being called the tithing-man, the head-borough, and in some countries the bortheider, or borough's elder, being suppos'd the directest man in the borough, town, or tithing. The distribution of England into tithings and hundreds is owing to king Alfred. See DECIERS, FRANK-PLEDGE, and FRIBURGH.

Tithonia, in Botany, so named by professor Desfontaines, in allusion to the glowing light-orange tint of its flowers, which the French call couleur aurore. The fabled favourite of Aurora, Tithonus, is therefore here meant to be commemorated. The allusion would have been still more happy, had the flower been one of the everlasting kind.—Desfont. Ann. du Mus. v. 149. Wildll. Sp. Pl. v. 3. 2246. Jull. 189. Lamarrck Illrtr. t. 708. Poiret in Linn. Dict. v. 7. 690.—Clays and order, Syngenesia Polygama-fruticans. Nat. Ord. Compositae oppositifolias. Linn. Corymbosus, Jull.

Gen. Ch. Common Calyx cylindrical, of a double row of ovate-oblong, acute, flat, nearly equal, erect scales. Cor. compound, radiated. Florets of the disk numerous, all perfect, level-topped, tubular; limb five-toothed; tube inflated near the base. Those of the radius female but abortive, about twelve; limb elliptic-lanceolate, acute, entire, horizontal, flat. Stam. in the disk only, Filaments five, capillary, shorter than the tube; anthers united into a cylinder of the same length. Pijl. in the disk, Germin oblong, slender; style thread-shaped, the length of the petal corolla; stigma two, recurved, obtuse; in the radius, germin very small; style scarcely any. Peric. none, except the unchanged calyx. Seeds in the florets of the disk only, solitary, ovate, smooth; their crown of five short, acute, erect, membranous scales. Recept. convex, chaffy, its scales concave, acute, rather taller than the seeds.

Eff. Ch. Receptacle chaffy, convex. Seed-crown of five chaffy scales. Calyx cylindrical; its scales equal, converging, in two rows. Florets of the disk inflated at the base; those of the radius elliptic-lanceolate.

1. T. tagetiflora. Marigold Tithonia. Desfont. as above, t. 4. Wildll. n. 1.—Native of Vera Cruz. Root annual. Stem erect, alternately branched, leafy, a foot high. Leaves alternate, on long stalks, downy, crenate, reticulated with veins, triple-ribbed; the lower ones deeply three-lobed; upper undivided, ovate, or somewhat heart-shaped, acute. Flowers on long solitary stalks, at the end of each branch, orange-coloured, about the size of a French marigold.

Tithorea, in Ancient Geography, a town of Greece, in the Phocide, on mount Parnassus, 80 stadia from Delphi. This place was famous for its sacred grove dedicated to Minerva, a temple with the statue of this goddess, and the tomb of Antiopé and Phocus. The temple of Eschelapius Argachetes was situated 70 stadia from Tithorea. The inclosure which contained the chapel of Isis was 40 stadia farther distant than the temple of Eschelapius.

Tithrasus, a town of Africa, in Libya, bordered by a river of the same name.

Tithronium, a town of Greece, in the Phocide, in which was a grove sacred to Apollo, with some altar and a temple, but without a sttate. This town was situated 15 stadia from Amphilca and 20 from Drymea, near the river Cephalus. Pausanias.

Tithymaloide, in Botany, so called from its affinity to Tithymalus, the Euphorbia of modern botanists, differs from that indeed merely in having the calyx gibbous on one side at the base.—Tourn. Infl. 654.—Two or three West Indian species of Euphorbia come under this description.

Tithymalus, titum-xo; of Dioscorides, suppos'd to be derived from tidum, the breath, in allusion to the milkiness of the plant.—Tourn. t. 18. See Euphorbia.

Titi, Santi di, in Biography, was born at Citta S. Sepolcro, in the Florentine state, in 1538. He first acquired a knowledge of painting under the tuition of A. Bronzino, and afterwards of Bandinelli, but owes the greater part of his fame to his studies at Rome, where he long resided, and from whence, as Lanzi observes, he carried back to his native country a graceful and scientific style of art, not supported by much ideal beauty, but chiefly characterized by the truth and freshness of nature; and in expression he had few superiors in any school, none in his own. He adorned his pictures with pieces of architecture, which science he in a measure professed, and by its means gave great relief to his figures, and increased the dignity and beauty of his compositions. His principal works are, the Supper at Emmaus, painted for the church of St. Croce, at Florence; the Resurrection of Lazarus, in the Duomo di Volterra; and the Descent of the Holy Spirit, painted for a convent at Citta di Castello. He died at Florence in 1603, aged 65, leaving a son, Tiburio Titii, born at Florence in 1579, who followed the same art with his father, but not with equal success. In
TITIAN.

generally he painted small portraits very skilfully, and made drawings in black-lead; of which there is a large collection in the Florentine gallery, made originally for the cardinal Leopold de Medici. He died in 1657.

TITIAN, the name by which we are acquainted with that great master, who is universally regarded as the head of the Venetian school of painting, Tiziano Vecelli da Cadore. This justly distinguished artist was born of noble parents at the castle of Cadore, in Friuli, in 1489, according to Vafari and Sandrart, though Roldan, and others after him, place the date of his birth three years earlier, in 1477: but as Giorgione was considerably older than he, and was born in 1478, we have preferred the authority of the former, as most likely to be correct. The education he received, first from Sebastiano Zucatti of Trevisi, and afterwards from Giovanni Bellini at Venice, rendered him a diligent and subtle observer of nature. His early works exhibit the greatest correctness of imitation, but in a laboured and minute style, with a finish so highly wrought, that when, at a maturer age, he painted a picture for Ferrara of the tribute-money, in competition with Albert Durer, he excelled in nicety of pencilling that master of minutenefs; with this difference, that his finish did not, like the German's, obtrude itself, and impede the general effect, but obtained grandeur by distance. This picture, to which he made no comparison, as he soon after changed his style, now adorns the gallery of Drefden, and remains a proof of the genius this great artist entertained of the falsity of that taste, which seeks for gratification in mere finish, and which he defetered for the adoption of a style conveying general character instead of identity. It was from the better taste of his fellow pupil, Giorgione, that Titian imbibed a more exalted view of art, and was induced to quit the meaner and more confined style with which he commenced his practice; and some portraits which he painted about this time are scarcely to be distinguished from those of Giorgione himself. But he seems to have found it not exactly to his mind, and soon discovered a variety of style more congenial to his own feelings; less softened, and perhaps less grand, but more agreeable; a style which delights the spectator less by novelty of effect, than by the exactness of truth. His first work in this style, which is entirely his own, and may be denominated Tizianesque, is the archangel Raphael leading Tobiah, painted in his thirtieth year for the facade of S. Marcia; and soon after he painted the Prentation of the Virgin, at the Carita; one of the richest and most numerous of his compositions remaining.

When only eighteen years of age, he had painted a portrait of the head of the Barbarigo family, which excited universal admiration; and he was soon afterwards employed, in concert, or rather in rivalry, with Giorgione, to paint one of the fronts of the Fondaco de Tedeschi, when unhappily the jealousy already subsisting between these great artists was strengthened by the superior encomiums bestowed upon Titian. On the death of Giorgione in 1511, Titian succeeded him in several important commissions, and continuing to increase in renown, was invited to the court of Alfonso, duke of Ferrara, for whom he painted the celebrated picture of Bacchus and Ariadne, now in England. Here he became acquainted with the poet Ariosto, whose portrait he painted, and in return was celebrated by him in his Orlando Furioso.

About 1533, Titian produced the work which, above all others, elevates him in the scale of merit among painters; viz. the celebrated picture of the Death of St. Peter the Martyr, for the church of S. Giovanni and S. Paolo at Venice, which has been considered his chef-d'œuvre in history. This extraordinary picture was one of the first objects of French veneration at Venice. It was painted originally on wood, but was transferred to canvas in France, in consequence of its having been much blighted from the wood by the effect of sea-water in its voyage to Marfellas; and it is now returned to its original station in a more agreeable, if not more perfect condition, than when it was first removed. The excellence of this picture procured him, according to Vafari, a commission from the Senate to paint the battle of Cadore between the Venetians and the Imperialists, or the rout of Giaradadda, in which the action proceeded during a tremendous storm of rain. This grand work was destroyed by fire, but the composition is preferred to us by the print engraved by Fontana. Besides these, he painted several other public works, which, together with the friendly assistance of Pietro Aretino, whose pen delighted to dwell upon the powers of this great artist's pencil, spread his fame in every direction, and he was honoured with a super-abundance of employment. In 1536, when Charles V. came to Bologna to be crowned by pope Clement VII. Titian was sent for by the cardinal Hippolito de Medici to paint the portrait of the monarch, which he did on horseback and in armour; which so pleased Charles, that he gave the painter 1000 crowns of gold, and declared he would never be painted by any body else. When Titian returned to Venice, he found Pordenone much employed and supported by several of the principal personages; but his great superiority soon became too manifest to be resisted, and he was more than ever employed, both publicly and in private.

In 1541 the emperor returned to Bologna, to hold a conference with the pope, and was again painted by Titian, as also the cardinal Hippolito de Medici to paint the portrait of the monarch, which he did on horseback and in armour; which so pleased Charles, that he gave the painter 1000 crowns of gold, and declared he would never be painted by any body else. When Titian returned to Venice, he found Pordenone much employed and supported by several of the principal personages; but his great superiority soon became too manifest to be resisted, and he was more than ever employed, both publicly and in private.

In 1541 the emperor returned to Bologna, to hold a conference with the pope, and was again painted by Titian, as also the cardinal Hippolito de Medici to paint the portrait of the monarch, which he did on horseback and in armour; which so pleased Charles, that he gave the painter 1000 crowns of gold, and declared he would never be painted by any body else. When Titian returned to Venice, he found Pordenone much employed and supported by several of the principal personages; but his great superiority soon became too manifest to be resisted, and he was more than ever employed, both publicly and in private.

Tetian had soon after the honour of painting pope Paul III., when he visited Ferrara in 1543, and was invited by that pontiff to Rome; but he excused himself at that time on account of an engagement with the duke of Urbino, whose portrait he painted with so much fire and truth, that Aretino honoured it with a sonnet, comparing it with that of Alexander by Apelles. He painted also several other pictures for the same duke of Urbino (Francesco Maria), and when he had completed his engagement there, accepted another invitation to Rome, sent by the pope, through the medium of cardinal Beppo.

He arrived there in 1546, according to Vafari, who was already known to Titian, having seen him at Venice, and was on this occasion honoured by the cardinal's appointing him Cicerone to this great painter; to conduct him through the city, and to shew him its beauties. Nothing could be more flattering than his reception by the pope, who immediately upon his arrival assigned him apartments in the Palazzo Belvidere, and employed him in painting his portrait at whole length, and that of the cardinal and the duke Ottavia, which gave universal satisfaction; but an Ecce Homo, which he painted as a present to the pope, was not esteemed by the Roman artists, whose minds were accustomed to the works of Raphael and M. Angelo. The latter is said to have remarked to Vafari, after seeing Titian at work on his Daniel, that it was a great pity the Venetian painters applied themselves so little to design, and had not a better mode of study,
study, being so perfectly skilful in colour and imitation. Adding, "if this man were as much aided by art in design as he is by nature, and most particularly so in giving just resemblance of natural objects, he would be perfect; as he has a noble spirit, and a beautiful and lively manner."

He did not remain long in Rome, but on his return to Venice visited Florence, where he beheld with delight the great works of art with which it was adorned, and visited the grand duke Cosimo, who declined his offer to paint his portrait, perhaps, as Vafari observes, that he might not give umbrage to the ingenious artists of his own city and dominions.

Immediately upon his arrival at Florence, he received an invitation from his patron, Charles V., to visit Spain, and accordingly went to Madrid, where he arrived in 1550. He remained there three years, during which time he painted a great number of portraits and historical pictures. For the portrait which he painted of the emperor, he received 1000 crowns of gold, and was created a knight of the order of St. Jago, and a count palatine of the empire, with a stipend from the treasury of Naples of 200 crowns annually; and to this, Philip II. added afterwards 200 more, besides paying him magnificently for each of his productions.

When Charles had devoted his life to the authorities of a convent, he commissioned him to paint a large picture of the Trinity, accompanied by the Holy Virgin, and surrounded by saints and angels, in which the emperor, and the empress his wife, were represented elevated to the heavens, and in the act of adoration. There is a sketch of it in England, and a print has been engraved from the picture, by which it appears to have been a very grand work.

Though Titian had returned to his native place before Philip II. came into possession of the throne, and was as much engaged as he could be, yet that monarch, when he had built the Escorial, and conceived the idea of enriching it with the most splendid materials, referred to his father’s favourite painter to assist him in perfecting it; and though it does not appear that Titian returned to Spain, yet he must have employed his pencil very skilfully in its service from the very great number of his pictures which are to be found there, many of them among his very finest productions. Several of these have been withdrawn by the scruples of bigotry from public view; and among them his picture of a sleeping Venus, which was presented by Philip IV. to our Charles I., when prince of Wales, on his visit to Spain, and which after his death was purchased by the Spanish ambassador, then resident here.

Titian was invited by Henry VIII. to England, but his numerous engagements on the continent prevented him from coming. He painted, however, two pictures for Henry, which now adorn Cleveland House (the marquis of Staf ford’s). Their subjects are the Bath of Diana, with the unfortunate intrusion of Acteon, and the Discovery of the crime of Calista, and both are exquisite performances, and in tolerably good preservation. They continued in the royal collection till it was dispersed on the death of Charles I., and found their way into the gallery of the duke of Orleans; and on the purchase of the Italian part of that collection being effected by the duke of Bridgewater, the earl of Carlisle, and lord Gower, these pictures fell to the lot of the former of these noblemen.

This great painter is one of the happy few, for whom nature and circumstances have combined in fortunate conjunction. "For him," as Vafari justly observes, "health and fortune laboured, and he received of heaven only happiness and blessings." By him the highest among men, the most learned, and the most beautiful, were proud to have their portraits transmitted to posterity. He was handom in person and graceful in manners, and lived in a style worthy of one so honoured and beloved. These blessings he was permitted to enjoy through a very uncommon portion of human existence, which was at length interrupted by the plague in his 96th year. He appears to have been able to pursue his delightful art to a very advanced period, for Vafari found him painting in 1566, when he visited him at Venice, and speaks of it with pleasure; and though it may well be imagined that the latter productions of his pencil exhibit the strong hand of time, yet they are free and masterly in every thing in which a perfect knowledge of the principles of the art are concerned, and speak only in the execution.

Had Giorgione lived but to one-half of the lengthened years of his great rival, Titian might not perhaps have found, as from his numerous excellent productions he now does. That noble work, the death of St. Peter Martyre, alone fully entitles him to this distinction and honour; perhaps no other production of the pencil is so perfect in the combination of every requisite quality of a fine painting; composition, design, action, expression, chiaro-fcuro, and colour. The choice of the scene, and the accompaniments, are every way adapted to afford in creating alarm and dismay; the tone of evening or twilight spread over the whole, and contrasted to the brilliant ray of heavenly light from above, aids the impression; and the execution is in every part correspondent to the grandeur of form selected. This picture he painted, as we have said, in the prime of his life, when he was about forty-three; and he continued long after to work in the same style, which is of his own creation, and totally different from both his former laboured one, and his latter loose and vague manner. In this picture, every part is wrought to an exact character of representation, though without minuteness, or in any degree trespassing upon the heroic nature of the tragic subject; and there is no introduction of heterogeneous matter, as is too frequently to be found in his lyric productions. Here he appears to have caught a glimpse of the grandeur of Michael Angelo’s style, and to have employed it more effectually than in any other of his works, except perhaps in the figures on the ceiling of the Salute at Venice, and the martyrdom of St. Laurence in the Jefuits’. In general, his selection of form is but little improved upon his model; his male figures being too flabby for character or action, and his females too full for elegance.

The mind of Titian appears to have been of a sedate and rather serious character. There is, as it John Reynolds has observed, "a senatorial dignity about him," which distinguishes him from his compeers of the Venetian school. All his compositions are arranged with gravity; even the gay and sometimes licentious subjects which he now and then amused himself with, are conducted with such a scale of chiaro-fcuro and colour, as gives an air of mortality to their effect, which imposes upon the spectator a tone of sobriety, and induces him to discard those loose thoughts which the gay luxuriance of the style of Rubens, treating the same compositions, would inevitably excite.

Colouring appears to have been the grand foundation of the success of Titian. He knew better than any other painter the just power of each colour of his palette; and by this knowledge, produced a species of chiaro-fcuro independent of light and shade, and perfectly distinct from that of Correggio and Leonardo da Vinci, and more immediately imitative of the general effects of nature. Master of the
means of imitating the most subtle combinations of colour in visible objects, and fully comprehending the degrees of purity or of tone with which colours might be employed individually or collectively, to affix in projecting or withdrawing the various parts of a picture, he never fails to gratify the eye with a full and true relief, correspondent with the nature of the subject. In this quality he was as much ideal, as the Greeks and Florentines were in form; for though the harmony and richness which he produced are to be found occasionally in nature, it is neither her every day attire, nor is it to be comprehended by superficial observers. There is a science of exceeding import to painting in the arrangements of colours, by which a skilful artist will create attraction or disgust, as it pleases him. Change the position of the colours of that most beautiful of nature's works, the rainbow; let the blue and the green occupy the centre, and the red and yellow the edges of it; and judge how far it will decrease in its power of attraction. Of this science, Titian was the first great poiffeur; and as he poiffessed the knowledge of the value of colours, so also did he that of the nature of shade; that colour (to the painter at least, though it be the absence of it to the philosopher) which destroys all colours, and renders all alike obscure; and which is the most difficult of attainment in all that relates to the art of colouring. The tone of shade that Titian employed, whatever be the substance which produced it, was used by no other so successfully, except Tin- toretto. It seems, in its union with the local colours of objects, to have produced the half tints without further labour; or at least to have laid such a foundation, as to have made that of the subsequent painting very trifling; and doubtless this mode of proceeding rendered him able to produce such an infinity of works as appear to have issued from his pencil. His errors flowed naturally, from the cafe with which he produced the beauties of his style; and as the mind was filled with gratification by the delightful harmony and richness of colour his works presented, so it fought the lesf for the qualities of expression, and appropriate drefs and action in the figures; and would not condemn too rudely the frequent admixture of heterogeneous matter.

To the accusations of exhibiting defects like these, the works of Titian are far less justly subject than those of his imitators and succeffcors in the Venetian school of painting; none of whom poiffessed the taste and judgment of this great master, though many were eminently likable in their respective departments.

TITIANO, GIROLAMO DANTE, called IL. According to Ridolfi, he was brought up in the school of Titian, and was employed by that master to assist him in several of his works. By frequently painting in conjunction with him, and sometimes copying his works, some of his pictures, retouched by Titian, have passed for originals by that master. He sometimes painted from his own designs, and his picture in the church of St. Giovanni at Venice, representing S. S. Cojno and Damiano, is worthy of the school in which he was educated. Bryan's Diet.

TITICACCA, or CHUCUITO, in Geography, a lake of South America, in the vicereignty of Buenos Ayres, diocefe of La Paz, and jurifdiction of Chucuito, the figure of which is oval, inclining nearly from N.W. to S.E., its circumference being about 80 leagues, and depth near the shore from four to fix fathoms, and towards the middle forty or fifty, without any shoals. Ten or twelve large rivers, beside a great number of smaller streams, discharge themselves into it. The water, though neither bitter nor brackish, is somewhat turbid, and its taste is so naifeous that it cannot be drank. It abounds with fish of two very different kinds; one large and palatable, called by the Indians Suchis, and the other small, infipid and bony, long since called by the Spaniards Boyas. It has also a great number of geese, and other wild fowl, and the shores are covered with flags and rushes, the materials of which the bridges are made. The western borders of this lake are called Chucuito, and those on the E. are denominated Omacayo. It contains several islands, from one to another of which the Indians pass on their balbas, a kind of rafts, supported by inflated skins. One of these islands is very large, and was anciently one mountain, since levelled by order of the Incas: this gave to the lake its own name of Titicaca, which, in the Indian language, signifies a mountain of lead. In this island the first Inca, Mancho-Capac, the illustrious founder of the empire of Peru, invented his political fable, that the fun, his father, had placed him, together with his fifier and confort Mama Oello Huaco, there, enjoining them to draw the neighbouring people from the ignorance, rudeness, and barbarity in which they lived, and humanize them by customs, laws, and religious rites dictated by himself; and in return for the benefits resulting from this artful stratagem, the island has, by all the Indians, been confidered as fared; and the Incas, determining to erect on it a temple to the fun, caused it to be levelled, that the situation might be more delightful and commodious.

This was one of the most splendid temples in the whole empire. Besides the plates of gold and silver with which its walls were magnificently adorned, it contained an immense collection of riches, all the inhabitants of provinces which depended on the empire, being under an indippensible obligation of visiting it once a year, and offering some gift. Accordingly, they always brought in proportion to their zeal or ability, gold, filver, or jewels. This immense mails of riches, the Indians, on seeing the rapacious violence of the Spaniards, are thought to have thrown into the lake; as it is certainly known they did with regard to a great part of those at Cufco, among which was the famous golden chain made by order of the Inca Huayna-Capac, to celebrate the festival of giving name to his eldest fon. But these valuable effects were thrown into another lake, six leagues S. of Cufco, in the valley of Orcos: and though numbers of Spaniards, animated with the flattering hopes of such immense treafures, made frequent attempts to recover them, the great depth of the water, and the bottom being covered with slime and mud, rendered all their endeavours abortive. For notwithstanding the circuit is not above half a league, yet the depth of water is in most places not less than twenty-three or twenty-four fathom.

Towards the S. part of the lake Titicaca, the banks approach each other, so as to form a kind of bay, which terminates in a river called El Defagurodo, or the drain, and afterwards forms the lake of Parisa, which has no visible outlet; but the many whirl-pools sufficiently indicate that the water suffers by a subterraneous passage. Over the river Defagurodo is built remaining the bridge of ruthels, invented by Capac Yupanqui, the fifth Inca, for transporting his army to the other side, in order to conquer the provinces of Collafuyo. S. lat. 16° 10'. W. long. 69° 56'.

TITILLARES VEN.E, a name given by some authors to the illiac veins.

TITILLATION, TITILLATIO, the act of tickling; i.e. exciting a fort of pleasurable idea, by a gentle application of some light body, upon a nervous part; and which usually tends to produce laughter.

TITILLICUM, a word used by some anatomical writers for the arm-pit.

TITIN ARA, in Geography, a mountain of Russia, in the
TITIOPOLIS, in Ancient Geography, a town of Asia, in Hauria, or the second Cilicia, one of the twenty-three towns, which, according to the Notitia of Hierocles, were under the metropolis of Seleucia; named Titopolis by William of Tyre.

TITUS FLAVUM, in Ancient Geography, a river of Illyria, which discharged itself into the sea at Scardona, and formed an arm of the bay between Liburnia and Dalmatia. Pliny. It is named Titus by Ptolemy.

TITZICHE, in Geography, a populous town of the principal city of Guriel, with a good harbour, on the Black sea. This place is also called Pelhino; 10 miles S. of Puti.

TITLARK, in Ornithology. See ALAUDA PRATENSA.

TITLE, in Civil and Canon Law, denotes a chapter or division of a book.

A title is subdivided into paragraphs, &c.—Each of the fifty books of the Digest consists of a number of titles; some of more, others of less.

TITLE is also an appellation of dignity, distinction, or pre-eminence, given to persons possessed of the same.

The titles of order or dignity, Loyseau observes, should always come immediately after the name, and before the titles of office.

The king of Spain has a whole page of titles, to express the several kingdoms and signories of which he is master. The king of England takes the title of king of Great Britain and Ireland: the king of France, the title of king of France and Navarre: the king of Sweden intitles himself king of the Swedes and Goths: the king of Denmark, king of Denmark and Norway: the king of Sardinia, among his titles, takes that of king of Cyprus andJeruffalem: the duke of Lorraine, the title of king of Jeruffalem, Sicily, &c.

The cardinals take titles from the names of some churches in Rome; as of St. Cecilia, St. Sabina, &c. and they are called cardinals of the title of St. Cecilia, &c.

The emperor can confer the title of prince, or count of the empire; but the right of suffrage in assemblies of the empire depends on the consent of the electors.

The Romans gave the titles of Africenus, Asiaticus, Macedonieus, Numideus, Creticus, Parthicus, Dacieus, &c. in memory of the victories obtained over the people of those countries. The king of Spain, after the like manner, gives honourable titles to his cities, in recompense for their services, or their fidelity.

TITLE expresses also a certain quality ascribed by way of respect to certain princes, &c.

The pope has the title of helieth; a cardinal prince of the blood, that of royal highness, or most royal highness, according to his nearness to the throne; other cardinal princes, most eminent highness; an archbishop, grace and most reverend; a bishop, right reverend; abbots, priests, religious, &c. reverend.

As to secular powers, to the emperor is given the title of imperial majesty; to king, majesty; to the king of France, most Christian majesty; to the king of Spain, catholick majesty; to the king of England, that of defender of the faith; to the Turks, grand signor and highness; to the prince of Wales, royal highness; to the dauphin of France, serene highness; to the grand duke, most serene highness; to the other princes of Italy and Germany, highness; to the doge of Venice, signory; to the grand-marshal of Malta, eminence; to nuncios, and to ambassadors of crowned heads, excellency.

The emperor of China, among his titles, takes that of tief, son of heaven. The Orientals, it is observed, are exceedingly fond of titles: the simple governor of Schiras, for instance, after a pompous enumeration of qualities, lordships, &c. adds the titles of flower of courtesy, nutmeg of conclusion, and rose of delight.

TITLE, in Law, denotes a right which a person has to the possession of any thing.

A title to lands is thus defined by Sir Edward Coke: titulus est justa causa possidenti id quod no grum ostit. It is the means by which the owner of lands hath the just possession of his property. There are several stages or degrees requisite to form a complete title to lands and tenements. The lowest and most imperfect degree of title consists in the mere naked possession, or actual occupation of the estate, without any apparent right, or any shadow or pretence of right, to hold and continue such possession. See Disseisin.

The next step to a good and perfect title is the right of possession, which may reside in one man, while the actual possession is either in himself or another. The third circumstance attending a title is the mere right of property, the jus proprietatis, without either possession or even the right of possession. It is possible that one man may have the possession, another the right of possession, and a third the right of property. But in the union of these three qualifications consists a complete title to lands, tenements, and hereditaments. For it is an ancient maxim of the law, that if no title is completely good, unless the right of possession be joined with the right of property; which right is then designated a double right, jus duplicatum, or droit doux. And when to this double right the actual possession is also united, when there is, according to the expression of Pleta, juris et fejus continens, then, and then only, is the title completely legal.

The statute 32 Hen. VIII. c. 9, hath provided, that no one shall sell or purchase any preferred right or title to land, unless the vendor hath received the profits thereof for one whole year before such grant; or hath been in actual possession of the land, or the revenue or remainder; or on pain that both the purchaser and vendor shall each forfeit the value of such land to the king and the protector.

A title to things personal may be acquired or lost by occupancy, by prerogative, by forfeiture, by custom, by use, by marriage, by judgment, by gift, by contract, by bankruptcy, by testamentary, and by administration. Blackf. Com. B. ii. See Possession and Property.

TITLE is also an authentic instrument, by which a man can prove and make appear his right.

There must be at least colourable title to come into possession of a benefice, otherwise the person is deemed an intruder. For prescription with title, see Prescription.

TITLE, in the Canon Law, is that by virtue of which a beneficiary holds a benefice: such is the collation of an ordinary, or a provision in the court of Rome, founded on a renunciation, permutation, or other legal cause. The title of
of a benefice, or beneficiary, is either a true or a colourable
one. A true or solid title is that which gives a right to
the benefice: such is that received from a collator who has
a right to confer the benefice on a person capable of it, the
usual solemnities being observed. See Collation, &c.
Colourable title is a seeming one; i.e., such an one as ap-
ppears valid, and is not. Such would be that founded on the
collation of a bishop, in case the benefice in question were
not in his collation.

By the canons, a colourable title, though false, produces
two very considerable effects. 1. That, after peaceable pos-
session for three years, the incumbent may defend himself
by the rule de triennali possessione, against such as would dis-
pute the benefice with him. 2. That in case he be profe-
cuted within three years, and obliged to surrender the ben-
efice, he shall not be obliged to restore the produce of it,
during the time he possessed it.

Title is also used, in several ancient synods and councils,
for the church to which a priest was ordained, and where he
was constantly to reside.

"Nullus in presbyterum, nullus in diaconum, nisi ad cer-
tum titulum ordinetur." Concil. Londin. ann. 1125.

There are many reasons why a church might be called
titulus, title: the most probable Cowel takes to be this, that
in ancient days the name of the saint to whom the church
was dedicated was engraved on the porch, as a token that
the saint had a title to that church; whence the church itself
became afterwards to be called titulus.

Titles, or Titular Churches, M. Fleury observes, were
formerly the denomination of a particular kind of churches
at Rome.

In the sixth and seventh centuries, there were four forts
of churches in that metropolis; viz. patriarchal, titular,
diaconal, and erarial. The titulus, titular, were, as it were,
parishes, each assigned to a cardinal-priest, with a certain
district or quarter depending on them, and a font for the
administration of baptism in case of necessity.

Title, Clerical or Sacerdotal, denotes a yearly revenue or
income of the value of fifty crowns, which the candidates
for priesthood were annually obliged to have of their own,
that they might be assured of a subsistence.

By the ancient discipline there were no clerks made, but
in proportion as they were wanted for the service of the
church, which is still observed with regard to bishops; none
being consecrated, but to fill some vacant see.

But for priests, and other clerks, they began to make
vague ordinances in the East as early as in the fifth century:
this occasioned the council of Chalcedon to declare all vague
and absolute ordinances null.

Accordingly the discipline was pretty well observed till
the end of the eleventh century; but then it began to
relax, and the number of priests was exceedingly in-
creased; either because the people became defrons of the
privileges of the clericate, or because the bishops fought to
extend their jurisdiction.

One of the greatest inconveniences of these vague ordina-
tions was poverty, which frequently reduced the priests to
fordid occupations, and even to a shameful begging. To
remedy this, the council of Lateran laid it on the bishops
to provide for the subsistence of such as they should ordain
without title, till such time as they had got a place in the
church that would afford them a settled maintenance.

There was also another expedient found out to elude the
canon of the council of Chalcedon; and it was appointed,
that a priest might be ordained on the title of his patri-
mony; that is, it was not necessary he had any certain place
in the church, provided he had a patrony sufficient for a
creditable subsistence.

The council of Trent retrieved the ancient discipline in
this respect, forbidding all ordination, where the candidate
was not in peaceable possession of a benefice sufficient to
subsist him; and allowing nobody to be ordained on patri-
mony or pension, unless where the bishop declares it to be
expedient for the good of the church: so that the benefice
is the rule, and the patrony the exception. See Ordi-
nation.

But this rule is not regarded, even in some Catholic coun-
tries, particularly France, where the patronal title is the
most frequent; and the title is even fixed to a very moderate
sum.

As to religious, the profession they make in a monastery
serves them for a title, in regard no convent is obliged to
maintain them; and as to mendicants, they are maintained
upon the title of poverty.

The title of the house and society of the Sorbonne are also
ordained without any patronal title, and on the sole title of
poverty; it being supposed a doctor of the Sorbonne
can never want a benefice.

Title for Orders. See DEACON, ORDINATION, and
PRIEST.

TITLIS, in Geography, a mountain of Switzerland, in
the canton of Uri, the most elevated in those parts, and
farcely inferior to the Schreckhorn and Jungfrau; it was
for a long time considered as inaccessible. The summit
of this mountain is called Nollen, and commands a very
picturesque scene of mountains and valleys; 11 miles S.S.W.
of Altorf.

TITMEG, a lake of North America. N. lat. 62° 15',
W. long. 99'.

TITMOUSE, in Ornithology. See PARUS.

TITOTO, in Geography, a town of Naples, in the pro-
vince of Basilicata; 6 miles S.W. of Potenza.

TITONEUS, in Ancient Geography, a mountain situated
on the confines of Thrace and Macedonia.

TITGOVO, in Geography, a town of Russia, in the go-
mernment of Kaluga; 40 miles E.S.E. of Kaluga.

TITSCHEN, New, or Novo Gieli, a town of Mo-
avia, in the circle of Prerau, well built and defended by
walls; 24 miles E.N.E. of Prerau. N. lat. 49° 32'; E.
long. 18° 10'.

TITSCHEN, Al, a town of Moravia; 2 miles S.W.
of New Titchen.

TITSCHEIN, a town of Moravia, in the circle of Ol-
mutz; 16 miles S. of Olmutz; in the circle of Prerau; 8 miles S.W. of Freyberg.

TITTERIE, a southern province of Algiers, which
extends from the river Mafafran, on the W., to the river
Booherak, on the E.; northerly it is bounded by the Me-
diterranean, and southward by Sahara; about 60 miles long
and 40 broad.

TITTERIE Gyras, a lake of Algiers, situated near
mountains; 60 miles S. of Algiers.

TITTERIE Dufb, or Hadjar Titterie, a ridge of precipices
in Algiers; on the summit is a large plain, with only one
narrow road leading up to it, where a tribe of Arabs keep
their granaries; 50 miles S. of Algiers.

TITTING, or DIETTING, a town of Bavaria, in the
bishops' of Aichstatt; 5 miles N. of Aichstatt.

TITTIUS, in Botany, a name given by Rumphius,
Amboyna. v. 3. t. 19, and t. 20, to two very different kinds
of trees, the latter of which is supposed by Jussieu to be a
CORNUTIA. See that article.

TITTAMING, or DITTING, in Geography, a
town...
TITU, in Ancient Geography, a town of India, on this side of the Ganges, which belonged to the Carman. Ptol. TITULAR, or Titulary, denotes a person invested with a title, in virtue of which he holds an office or benefice, whether he performs the functions of it or not. In this sense the term is used in opposition to survivor, and to a person only acting by procuration, or commission. An officer is always reputed titular till he hath resigned his office, and the resignation hath been admitted.

TITULAR, or Titulary, denotes a person invested with a title, in virtue of which he holds an office or benefice, whether he performs the functions of it or not. In this sense the term is used in opposition to survivor, and to a person only acting by procuration, or commission. An officer is always reputed titular till he hath resigned his office, and the resignation hath been admitted.

Titulars of Tithes, a term sometimes applied to persons who had the possession of tithes under the crown in Scotland. They had also other names or titles applied to them in some cases. See Tithes.

TITLULUS, in History, a town of Judaea, in the reign of the Emperor Hadrian. It is difficult to ascertain the exact period of its existence, but it is known to have been a Roman city.

Titus, in Scripture Biography, a disciple and companion of the apostle Paul, who attended him in many peregrinations to Jerusalem, Ephesus, and Crete, and who was deputed by him on several important services. For an account of the epistle addressed to him by St. Paul, see Ephesians.

Titus, in Biography, a Roman emperor, was the eldest son of Vespasian, and born A.D. 40. In the course of his education at the court of Nero, he made a great proficiency in the study of eloquence and poetry. In his military service he first ranked as tribune in Germany, and afterwards in Britain; and by his valor and skill, as well as by the graces of his person and manners, obtained great applause. On his return to Rome, he acquired reputation in the forum as a successful pleader. His first wife was the daughter of a Roman knight, and after her death he married a lady of illustrious descent, whom he divorced after she had borne him one daughter. Having distinguished himself as quaestor, he served as lieutenant under his father in the war of Judea, during which he gained renown, not only by his military enterprises, but by the mildness and generosity of his temper; and though he did not abstain from the indulgences of youthful propensities, he did not neglect serious occupations. When Vespasian, after the death of Otho, was deliberating about assigning the purple, he acted as mediator in the confederacy between him and Mariana, the governor of Syria; and when Vespasian marched to Italy, Titus was entrusted with the prosecution of the war in Judæa. When his father took possession of the imperial authority, he declared Titus his colleague in the confulate, A.D. 70. In that year Jerusalem was taken after a calamitous siege, and the destruction of the temple, which Titus wished to have preserved. After the reduction of Jerusalem, he went to Alexandria, and took part in the superstitions of the consecration of the ox Apis; and after having given audience to the ambassadors of the king of Persia, he hastened to Rome with a view of counteracting some unfavourable rumours, and was honoured with a magnificent triumph. Vespasian admitted him to a participation of the empire, and they continued to co-operate in the exercise of the imperial power, and lived together in amicable intercourse. Suetonius, however, intimates that Titus's conduct was in a variety of respects very far from being irreproachable, either in private life or in his public character. During the war in Judæa, he had indulged a violent passion for Berenice, daughter of Agrippa I. king of the Jews, and widow of Herod, king of Chalcis; and as he followed him to Rome, he gave offence to the people by his attachment to a foreign queen of doubtful reputation; and, as Suetonius says, suspicions were entertained that Titus would eventually prove a second Nero.

Upon the death of Vespasian, A.D. 79, Titus immediately succeeded him; and by his conduct towards his rival Domitian, and to those who adhered to his interest, he gained the affection of the people, and established a character, which has caused him to be recorded under the glorious title of "The Delight of the Human Race." Although his reign was short, it was distinguished by a series of benevolent actions: not always, perhaps, equally liberal in the principle from which they originated. This course of beneficence was commenced by a confirmation of all the grants and donations made by his predecessors. And he thus established a precedent, which governed the conduct of his successors. Upon assuming the office of chief pontiff, he avowed it to be a solemn engagement not to shed the blood of a citizen, and to this resolution he adhered in a conspiracy against himself. In the case of one of the two patricians implicated in this crime, he calmed the anxiety of his mother by deputing a special messenger to assure her that for an's life was in no danger. Besides, he abrogated the law of high-treason with respect to all convicts for words or writings against the person or dignity of the emperor.

It was one of his maxims, "that no one ought to depart discontented from the person of his prince;" and on this he founded his practice of giving hopes to petitioners when he thought it necessary to refuse their requests. If we connect this maxim with his well-known exclamation at the close of a day on which he had conferred no benefit, "My friends I have lost a day," we cannot forbear supposing that the benefits to which he referred were rather acts of private bounty to courtiers or importunate suitors, than the performance of public duties. Many influences occur of his love of popularity, and of the excels in which he indulged it. The public calamities that happened during his reign gave occasion for the exercise and display of his compassion and bounty; such were the great eruption of Mount Vesuvius, which destroyed Herculaneum, Pompeii, and other towns; and the conflagration of Rome, which was followed by a fatidemic disorder. His general conduct entitled him to the affection of his subjects; nor does he seem to have deserved reproach for any act of injustice or oppression. Whist he was on a journey to the country of the Sabines, he was seized with a fever, which terminated fatally, on the 15th of September, A.D. 81, in the 41st year of his age, and after a reign of two years and less than three months. Preparing his dissolution, he lamented his early and premature doom; and yet, though his death was deplored at Rome as a general calamity, it was perhaps, considering the flexibility of his disposition, and his inclination to profuse
TIV


TITWALL, in Geography, a town of Hindoostan, in Baglan; 28 miles E. of Balleen.

TITYRUS MYSN, in Ancient Geography, a mountain in the western part of the isle of Crete, in the country named Cydonia, according to Strabo. On this mountain was a temple named Dictynnaeum Templum. In some copies of Strabo, this mountain and temple are placed in the town of Cydonia.

TITZ, in Geography, a town of France, in the department of the Roer; 4 miles N.E. of Juliers.

TITZLA, a town of Asiatic Turkey, in Caramania, on a salt lake; 60 miles S.W. of Kirkeh.

TIVA, a town of the Arabian Irak; 130 miles W. of Balfour.

TIVER, in Rural Economy, the provincial name of a substance of the colouring ochre kind, used for marking sheep in some places.

TIVERING, a term applied to the act or operation of marking sheep and lambs in different ways, with the material of the tiver kind, in some districts and places, for particular uses and purposes. Thus, it is a practice with some correct sheep-farmers to have their sheep tivered so as to ascertain different points in their management with great exactness. The bows or breasts of the rams are tivered every two or three days in the topping or riding season, and the ewes which are put to them, the first week, marked with one stroke of tiver, thofe of the second week, with two strokes, and so on. The tivering of sheep is also useful on many other occasions for marking and distinguishing the objects and views of the sheep-farmer. The practice of it is very common in the Romney-march system of sheep-grazing. See SHEEP.

TIVERTON, in Geography, anciently called Twyford-town, a borough and market-town in the hundred of the said name, and county of Devon, England; is situated on the banks of a hill between the rivers Exe and Loman, 14 miles N. by E. from Exeter, and 163 miles W. by S. from London. In the time of Alfred it was only a village, but had twelve tithings belonging to it, and was governed by a portreeve. Henry I. granted the manor and lordship to Richard Rivers, afterwards earl of Devon, by whom a castle was erected here about the year 1106, which continued to be the baronial residence for a considerable number of years. The attractions of the castle occasioned a great increase in the buildings and population of Tiverton; and by the favour of the lords, it was invested with the privilege of a market as early as the year 1200. About fifty years afterwards, the stream of water, now called the Town-Leat, was conducted from the distance of five miles to supply the inhabitants; and a piece of waste land, called Elmore Common, was given for the benefit of the poorer claffes, either for paffurage or for cultivation. These advantages continued to attract new settlers; but the most rapid augmentation of the town took place on the final establishment of the woollen manufacture about the year 1500. Towards the close of Elizabeth's reign, Tiverton was the principal place in the county for the manufacture of woollen goods; particularly kerseys, which still continue to be the chief article made here. About this period, the prosperity of the town received a temporary check: in 1591 it was visited by the plague, to which 550 persons fell victims; numbers fled for safety; and the inhabitants were so thinned, that the growing of grafs in the streets is particularly recorded. Scarcely had the town recovered, when it was nearly destroyed by fire, April 3, 1598, when more than four hundred houses were consumed, and thirty-three persons perished in the flames: the value of the property destroyed was estimated at 150,000l. In about a dozen years from that time, Tiverton was again esteemed a town of great importance, and called the chief market-town of the West. Many rich clothiers and merchants lived in it, and 8000 people were constantly employed in its woollen manufactories. The buildings were increasing in number and respectability, and Tiverton would have probably become one of the greatest manufacturing towns in the kingdom, but for a second conflagration, which destroyed nearly all the property of the inhabitants, and wholly blighted their flourishing expectation. In this fire, which happened August 5, 1612, six hundred houses were destroyed, with goods and merchandise to the amount of 200,000l.; and the inhabitants of every description were reduced to the greatest diffreces. The poor manufacturers were distributed in different towns, by which means the advantages of the clothing trade that had hitherto been exclusively enjoyed by Tiverton, were extended to other parts of the county. In the year 1615, Tiverton received its first charter of incorporation from king James; and its government was vested in a mayor, twelve capital burgesses, and twelve assiduous burgesses. The right of returning two members to parliament was also granted to the same persons. This charter continued in force till 1723, when it was forfecuted by neglect, and a new one, exactly similar, was granted by George I. In 1731, a third destructive fire occurred, which again nearly laid waste the town. During the 17th century, the trade and population progressively increased; but in the following century, rapidly declined: a favourable alteration has recently taken place, and the general trade of the town is now on a respectable basis. By the parliamentary return of the year 1811, the number of houses is stated to be 1503, the inhabitants 6732. A weekly market is held on Tuesdays, and two fairs annually. The spot of ground on which Tiverton is built, partakes of a triangular form, from the course of the rivers by which it is bounded. Its greatest length is nearly one mile; its breadth exactly three quarters. The four principal streets form a quadrangle, including an area of gardens, in the centre of which is a bowling-green. Most of the houses are of red brick, or of stone, and are generally covered with blue slate. Those on the outskirts of the town, and at the ends of the streets, which escaped the fire of 1731, are of earth or cob, covered with thatch. The principal buildings are the castle, the church, and the free grammar-school. The castle, from the present remains, appears to have been nearly of a quadrangular form, including an area of about an acre, and surrounded by strong walls, from twenty to twenty-five feet in height. At the angles were embattled towers, about thirty-five feet high. This fortress was secured from attack on the W. side by a steep declivity of about sixty feet, on the edge of which a lofty wall was built. Two wide and deep moats, filled with water from the Town-Leat, defended the whole of the N. and S. walls, to each side of the causeway leading to the gate on the E. This castle has been frequently exposed to sieges: during the reign of Stephen, and in the contest between the houses of York and Lancaster, it was several times subjected to the assaults of the contending parties; and in the civil war of Charles I. being garrisoned for the king, it was besieged and taken by the parliamentary forces. From this period the castle has been falling to decay; and several of the ancient buildings have been converted into the offices of a farm. Great part of the S. and W. walls, with parts of the towers at the angles, are till standing. The moat at the S. side is converted into a good kitchen garden;
garden; that on the N. side is filled up, and made part of a court-yard. The church is situated on an eminence, at a short distance from the castle; and though the work of different ages, is more regular than might have been expected. The S. side is ornamented with much curious sculpture. The tower is a plain stone structure, ornamented with battlements and pinnacles: the height is 116 feet. The interior of the church is spacious, and its chancel is separated from the body of the church by a screen, ornamented with elegant tracery. The church being too small for the reception of the inhabitants of the town, a chapel of ease was erected about the year 1733; and here are also several meeting-houses for dissenters of various denominations. A free grammar-school was erected about the year 1604, pursuant to the will of Peter Blundell, a native, and eminent clothier of this town; who, from a very low origin, by a long life of successful industry acquired an ample fortune; and bequeathed 40,000/ to various charitable purposes. In this school he provided for the instruction of 150 boys; with maintenance for three scholars in each of the universities of Oxford and Cambridge, to be chosen out of his school. Here are also a charity-school, a free English school, several alm-houses, and other endowments for the benefit of the poor inhabitants. The other public buildings are: the town-houfe, a spacious edifice, appropriated to the meetings of the corporation, grand juries, and other public bodies; the market-houfe, a large quadrangular fabric, for the standing and sale of corn; and the hospital or poor-houfe, an extensive structure, erected in 1704, and containing various workshops for the employment of those whom indigence or misfortune may oblige to have recourse to it. The parish of Tiverton is upwards of nine miles in length, and about eight miles in breadth.

At a short distance to the south of Tiverton is Collipriest Houfe, formerly the seat of the Blundell family, but now the property of Thomas Winslow, Esq. who recently rebuilt and enlarged the mansion. It stands on the site of an eminence near the river Exe, having a sloping lawn in front, and a hanging wood behind.—Historical Memoirs of the Town and Parish of Tiverton, &c.; by Martin Dunsford, Exeter, 4to. 1790. Beauties of England and Wales, vol. iv. Devonshire; by J. Britton and E. W. Brayley, 1803.

TIVERTON, a town of Rhode island, in the county of Newport, containing 2837 inhabitants, situated on the Taunton river; 15 miles S.E. of Providence.

TIVHOLM, a small island of Denmark, in the Cattegat; 4 miles N.E. of Fladgard.

TIVIÇA, a town of Spain, in Catalonia; 15 miles N.E. of Tortosa.

TIVIOT, a river of Scotland, which rises about 12 miles S.W. from Hawick, and runs into the Tweed, at Kelso. The valley which it waters is called Tiveidale.

TIUKI-KARAGAN, a cape on the E. side of the Caspian sea; 156 miles S.E. of Astrachan. N. lat. 44° 20'. E. long. 50° 14'.

TIULIT, a town of Africa, in the kingdom of Fez; 12 miles S.W. of Fez.

Tiuumen, a town of Russia, in the government of Tobolofe, at the union of the Pechora and the Tura. This town is not built parallel to the river Tura, but at right angles with it; and the little river Pechora runs through the town, and falls into the Tura at the extremity of it. Over the river is a bridge of eighty-three fathoms in length; and a little below it stands a fort, built with stone, in which is a church of the same materials. Without this fortification, and towards the lower bank of the Tura, are fix wooden churches, a convent of nuns, with a church, and 500 dwelling-houses. At the lower end of the town is an oftreg. Beyond the Tumenka lies the Yamkaia floboda, or suburb, consisting of 250 houses, inhabited by people of all ranks and professions; and at the extremity of this suburb stands a monastery: it has likewise three churches, built of stone. Another suburb lies opposite to Tiumen, on the N. side of the Tura, which is inhabited by Russians, Mahometan Tartars, and Bucorians; 112 miles W.S.W. of Tobolofe. N. lat. 57°. E. long. 66° 14'.

TIVOLI, formerly called Tibur, a town of the Pope's dominion, in the Campagna of Rome, situated on a rocky mountain, planted with olive-trees, which are faid to yield the best oil in Italy; the site of a bishop held immediately under the pope. The town itself is mean, and contains a great number of forges. The cathedral is built on the ruins of a temple of Hercules. In the market-place are two images of Oriental granite, representing Isis, the Egyptian deity. The principal beauty of this place arises from the river Tevere, which falling headlong about fifty feet down the rock, forms a noble cascade, and several lefser ones, called Le Cacaddelle. The latter are extremely picturesque; and is also a deep ravine in the hill, called La Grotta di Nettuno, into which the great cascade falls. To enrich the view, here are some remains of ancient buildings, as the villa of Maxenias, and particularly the little round temple of the Sibyl, as it is commonly called, but rather of Vest[a; one of the most elegant remains of the Grecian architetture. The natural gift will here take pleasure in observing the continual formation of new Tiburtine stone from the deposit of water descending from the calcareous Apennines; 15 miles E.N.E. of Rome. N. lat. 41° 58'. E. long. 12° 46'.

TIURANEN, a small island on the E. side of the gulf of Bothnia. N. lat. 65° 39'. E. long. 24° 46'.

TIUTERS, an island of Russia, in the gulf of Finland; 80 miles E.N.E. of Revel. N. lat. 59° 40'. E. long. 27° 14'.

TIVY, a river of South Wales, which rises about 5 miles N. from Tregaron, and runs into the sea about 5 miles below Cardigan.

TIXIER, John, (Lat. Ravifbus Textor), in Biography, a person of literary character in France, was lord of Ravily in the Nivernois, and educated in the college of Navarre at Paris, where he taught the belles-lettres, and whence he issued many of his publications for the use of his students. In 1500 he was appointed rector of the university of Paris, and he died, as some say in the hospita], in 1522. His works are, "A Collection of Latin Letters," "Dialogues," "Poems," "Epigrams," "Orations," &c. in Latin, written in good style; "Officina, seu potius Nature Historia," &c., several times reprinted; "De Memorabilia et claris Mulleribus, aliquot diversorum Scriptorum Opera," to which he has annexed the life of Joan of France, written by himself. Morevi.

TIZ, in Geography. See Tiz.

TIZRI, in Chronology. See Tisri.

TIZZANO, in Geography, a town of the duchy of Parma; 13 miles S. of Parma.

TIZZANO, in Geography, a town of the duchy of Parma; 13 miles S. of Parma.

TIZZANO, in Geography, a town of the duchy of Parma; 13 miles S. of Parma.

TLACOLOZOLTOL, in Zoology. See Ocelot.

TLAM, or SLAM, in the Alum-Works, a word used by the workmen to express a fort of mud or sourna of which does great hurt to the alum, rendering it foul and coarser. The slam is a muddy substance settling to the bottom of the
the vessels; but in the boiling of the liquor it gives a reddish colour, and disorders the whole works when in any great quantity. They always pHs their liquor over four parcels of the alum-rock, and the leaf, if not carefully calcined, generally gives it this disadvantageous mixture. Phil. Trans. N° 142.

TLANHQUACHUL, in Ornithology, the name of a Brazilian bird, very much approaching to the nature of the European plate, or spoonbill. It is a very voracious bird, and feeds on live fish, but will not take or meddle with dead ones, and is all over of a beautiful red. It has a black ring round the upper part of its neck, and is common about the shores of the sea and rivers.

TLAQUACUM, in Zoology, the name given by the Spaniards, and some others, to a very remarkable animal in America, commonly known among us by the name of the porcup or opoum.

TLAQUATZIN, a name by which the natives in some parts of America call the opoum.

TLAQUATZIN Spinofum., the name by which Hernandez has called the cana, a fort of Brazilian porcupine.

Tlacasa, in Geography, a province of North America, in the government of Mexico; bounded on the N. by Guatema, on the E. by the gulf of Mexico and the province of Guazac; on the S. by the Pacific ocean, and on the W. by the province of Mexico Proper; about 320 miles in length, and from 40 to 120 in breadth. The climate, soil, and produce, are much the same with those of Mexico Proper. On the W. side there is a chain of mountains for the space of eighteen leagues, very well cultivated; and on the N. is also a great ridge of mountains, covered with perpetual snow, the neighbourhood of which expoxes it to horrid tempeuts, hurricanes, and frequent inundations, whereby houses, even on the top of eminences, are sometimes endangered. Yet this is allowed to be the most populous country of all America: and this is partly ascribed to its having been originally an ally to Cortez, in the conquest of Mexico, who obtained a grant of it from the emperor Charles V., also king of Spain, by which it is still exempt from any service or duty whatsoever to that crown, only paying the king of Spain a handful of maize for each head, as an acknowledgment; which inconsiderable parcels were paid, upwards of fifty years ago, to make up 1,300 buffelis; for it produces so much of the Indian corn, that hence it had the name of Tlacsala, that is, the Land of Bread. By this means the towns and villages swarm with Indians. This province was anciently a monarchy, till civil wars arising among the inhabitants, they formed themselves into an aristocracy of many princes, in order to get rid of them. They divided their towns into different districts; each of them nominated one of their chiefs to reside in the court of Tlacsala, where they formed a senate, whose resolutions were a law to the whole. Under this form of government they maintained themselves long while against the kings of Mexico, and continued in it till the reception of the Spaniards under Cortez.

Tlacasa, a town of North America, and anciently the capital of a province to which it gives name, situated on a river, which runs into the Pacific ocean. When the Spaniards first arrived here, it is said to have contained 30,000 inhabitants: and Acosta affirms, that it had a market-place large enough to hold 30,000 buyers and sellers; that in the fumbles were sold less than 1500 sheep, 4000 oxen, and 2000 hogs. But matters were so much altered, that Gemelli, who was here in 1638, says it was then become an ordinary village, with a parish-church, in which hangs up a picture of the ship which brought Cortez to La Vera Cruz. The inhabitants formerly offered up human sacrifices, and when the Spaniards first arrived here, we are told by Diaz del Cañillo, that they found wooden cages, in which prisoners were confined to be fattet for victims; 20 miles N. of Puebla de los Angeles. N. lat. 19° 45'. W. long. 98° 30'.

TLAYOTIC, in Natural History. See Colic-Stone. TLEMSAM, or Telemesen, in Geography. See TREMEECE.

TLETSCH, a town of Russia, in the government of Tobol, on the Irtisch; 72 miles E.S.E. of Tobolik. TLEUQUEHOLTOTOT, in Ornithology, the Mexican name of a bird of the wood-pecker kind, described by Nieremberg under the name of the avis salutiferus; the feathers of a red crest it carries on its head being supposed a remedy for head-aches.

TLOS, in Ancient Geography, a town of Asia Minor, in Lydia, at the pafs of a mountain, on the side of Cybara, according to Strabo. It is placed by Ptolemy in the number of the interior towns of Lydia, in the vicinity of mount Cragas.—Alfo, a town of Asia, in Pifidia. TLMACZOW, in Geography, a town of Moravia, in the circle of Hradich; 15 miles N. of Hradich. TMAIE', a town of Egypt; 12 miles S.E. of anfora.

TMAURUS, in Ancient Geography, a mountain of Epirus, in Thespotia, at the foot of which was a temple. Strabo. It was also called Tamarus and Tornarua.

TMATARACAN, or Tamarican, literally denoting the "swarm of beetles," called in Theodorus's Itinerary "Tamatarse," a name anciently given to the city of Taman, over the suburbs of which extend all the ruins of the ancient city of Phanogoria. The distance across the Bosphorus from Tmataracan to Kertchy, e. e. from Phanogoria to Pantaeopurus, is found to correspond with the actual distance from Taman to Kertchy. Among other antiquities of Taman, one of the most remarkable is the Nau- machia, or amphitheatre for naval battles, not less than 1000 paces in diameter, with its whole area paved. The subterraneous conduits for conveying water still remain, but are applied to other uses. The materials of the ruined buildings do not exist in the isle of Taman, but must have been brought from the Crimea, from Greece, or in later ages, by the Genoese from Italy. The distance from Taman to Yenikele, on the opposite shore, is about 12 miles. Clarke's Travels, vol. ii.

TMESCHEDE, or Muschede, a town of Germany, in the county of Arenberg, on the left side of the Roer; 3 miles N.W. of Arenberg.

TMEIESPETERIS, in Botany, an uncoth, however learned, name, composed of τμητης, a notch, or incision, and περης, a fern, because the capules are seated in the notches of the frond.—Bernhardi in Schrad. Journ. for 1800, 131. t. 2. f. 5. Wild. Sp. Pl. v. 5. 56. Swartz Fil. 187. Labill. Nov. Holl. v. 2. 105. t. 252. This fern is referred by Mr. Brown to Psilotum. (See that article.) We ought there to have noticed Mr. Brown's remark, that the plant of Forlifer differs from Labillardiere's, in not having abrupt leaves, and that it was found in New Zealand, not in the isle of Tana. Willdenow has judiciously observed the difference between Bernhardi's figure, and that of Labillardiere. Mr. Brown says both these species are pastoral, on the stems of arborescent ferns.

TMESES, τμητης, formed from τμητης, in cut, a figure, by which a compound word is separated into two parts, and one or more words interposed between them.

Thus,
Thus, when Terence says, "que meo cunque ano animalium est facere," there is a tmesis; the word sequacque being divided by the interposition of meo.

Lucilius abounds in tmesis; as "fac pe fauitam tacu praterque meum," or "difficio potis eft fegungi, fegque gregarii," and "difcicis difque gregatiis."

TMULOS Moni in Ancient Geography, a mountain of Asfa Minor, in Lydia. Strabo says that the town of Sardis is commanded by the TMolus, a rich mountain, on the summit of which the Persians had erected a turf, from which might be seen all the adjacent fields, which were watered by the Caytulus. According to Homer it obtained, from its extraordinary elevation, the name of Ventalo, or windy. From Pliny we learn that the Paélolus, Chryforrhoas, and the fountain Tame, have their sources in this mountain, and that it produces excellent wine, highly commended by Pliny and Vitruvius. The summit is represented as always covered with snow. It was sometimes denominated Timolis, as by Ovid,

"Dea femeris Nymphae? . . . Timoli."

According to the mythologists, it was in this mountain that Apollo punished Midas, king of Phrygia, by giving him ass's ears.

TMOLUS, a town of Asfa Minor, in Lydia, on mount TMolus. According to Tacitus, TMolus was one of the two towns overthrown by an earthquake, in the fifth year of the reign of Tiberius, A.D. 117, and it was rebuilt by this prince.

TMORUS, the name of one of the summits of the Ceraunian mountains, in Epirus.

TMULGA, in Geography, a town of Algiers; 10 miles E. of Sinaab.

TYNNUS, in Ancient Geography, a town of Asfa Minor, in Caria.

TOA, in Geography, a river of the island of Porto Rico, which runs into the harbour of Porto Rico.

TOAD, Rubeta, Rana Bufo of Linnæus, in Zoology, a creature sufficiently known. See Rana.

The toad has been generally considered as a poisonous animal, but Mr. Pennant apprehends without sufficient reason. They have been taken up in the naked hand without the least injury, and quacks have even eaten them, and drank their juices without damage. Besides, they are common food to many animals, as buzzards, owls, Norfolk plovers, ducks, and snakes; of late, indeed, live toads have been applied to cancers, with a view of curing them: facts have been alleged in proof of their efficacy for this purpose. The mode of applying them has been to put the animal into a linen bag, and to hold its head, pressing out of the bag, to the part, which has been laid hold of and sucked greediness till it dropped off dead. The creature has swelled and appeared to be in great pain; often sweats much and turns pale; and sometimes digresses, recovers, and becomes lively again. For other particulars, we must refer to Mr. Pennant's appendix ubi infra. The time when toads propagate is early in the spring; at which season the females are seen crawling about oppressed by the males, who continue on them for some hours, and adhere so fast as to tear the skin from the part to which they stick. They impregnate the spawn as it is drawn out in long strings, like a necklace. And the female is afflicted by the male, in discharging the spawn, who with his hinder feet pulls out the eggs, while his fore-feet embraces her breast. The eggs are included each in a membraneous coat that is very firm, in which is contained the embryo, and these eggs, fastened to one another by a short but strong cord, form a kind of chaplet, the heads of which are distant from each other about half their length. The male, by drawing this cord with his paw, performs the functions of a midwife, and acquires himself in it, it is said, with a dexterity which could not be expected from so lumpish an animal. Pennant's Brit. Zool. vol. iii. p. 14. p. 385, &c.

The toad of Surinam, or rana pipis of Linnæus, has long been an object of attention to the curious, on account of its enormous bulk and ugly form. Dr. Fermin, in his "Traité des Maladies les plus fréquentes à Surinam," &c. published at Maastricht in 1764, has given some remarks on its mode of generation. Having put three males and a female into an open vessel of water, he observed that one of them had several spots on its back, which were eggs, each containing an embryo. At the end of three weeks, the animal seemed much agitated, and one of the cells on its back bursting open, a young one crept out of it. In five days no less than thirty-five of these cells opened in the same manner and produced as many animals. On the back of one of these which was dissected, there were no less than one hundred and twenty of these cells, each of which considered as a real matrix, in which its eggs are lodged and fecundated; and, indeed, in one of them he discovered an embryo completely formed, enveloped in a kind of placenta, accompanied by two thin transparent membranes, seemingly analogous to the chorion and amnion in other animals. For other species of toad, see RANA.

TOAD-Fish, Rana pipicaris, in Ichthyology. See Lophius Pipicaris, and Sea-Devil.

TOAD-Plas, in Botany. Antirrhinum.

TOAD-Stone, in Mineralogy, a variety of trap-rock. (See Trap.) The toad-stone of Derbyshire is generally a dark-brown basaltic amygdaloid, composed of an intimate intermixture of basalt and green earth, and containing oblong cavities, principally filled with calcareous spar. It sometimes assumes the form and texture of a compact basalt, and is also found in a decomposing soft slate, approaching to clay. In composition and appearance it bears a strong resemblance to some volcanic rocks; and there are certain peculiarities in the geological position of this rock, which have excited considerable attention. Mr. Whitehurst, in his Theory of the Earth, has given a particular account of the Derbyshire toadstone; and has stated the number of beds, and the thickness of each, with that of the mountain lime-stone, with which it alternates, as under:

<table>
<thead>
<tr>
<th>Type of Stone</th>
<th>Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>First lime-stone</td>
<td>50 yards</td>
</tr>
<tr>
<td>First toad-stone</td>
<td>16</td>
</tr>
<tr>
<td>Second lime-stone</td>
<td>50</td>
</tr>
<tr>
<td>Second toad-stone</td>
<td>40</td>
</tr>
<tr>
<td>Third lime-stone</td>
<td>60</td>
</tr>
<tr>
<td>Third toad-stone</td>
<td>22</td>
</tr>
<tr>
<td>Fourth lime-stone</td>
<td>not cut through</td>
</tr>
</tbody>
</table>

It appears, however, that the thickness and extent of the toad-stone beds are by no means so regular as those of the other strata, in the same district.

In some situations, one or more of the beds will become very thin, or be entirely wanting; in other situations, a single bed will be found of vast thickness: and masses of this sublance, which cannot be referred to any of the three beds, will be found interposed in the lime-stone strata. In some instances, particularly near Ashover, nodules of lime-stone may be seen imbedded in toad-stone. Farcy's Derbyshire Report, vol. i. p. 276.

The most remarkable phenomenon which the beds of toad-stone present in Derbyshire, is the complete separation of the metallic veins which they generally occasion. The mountain line-
lime-stone of that district is intersected by numerous perpendicular metallic veins, which rise from the lowest lime-stone to the uppermost; but on striking through the vein in the first lime-stone, down to the first toad-stone, the vein will entirely disappear, but on perforating through the toad-stone, it will be found again in the second lime-stone; and the same appearances will be presented on piercing through the second and third beds of lime-stone, and the second and third beds of toad-stone. See Plate IV. Geography, fig. 1, where 1, 2, 3, 4, represent the four beds of lime-stone; b, b, b, the three beds of toad-stone; and v, v, v, v, the metallic vein passing through the different lime-stone beds, but completely cut off or separated by the intervening beds of toad-stone. To account for this interruption of the vein at v, v, Mr. Whitehurst supposes that the toad-stone, in a state of igneous fusion, has burst through the lower strata, and has forced itself between the strata of lime-stone by a lateral motion. Were this the case, we must admit that the toad-stone had risen through fissures or dikes, similar to what exist in many of the northern parts of Britain, and are called whin-dikes. The whin-stone, or basalt, bearing a close resemblance to toad-stone, and the strata in the peak of Derbyston being much fractured, we should feel little difficulty in admitting the probability of Mr. Whitehurst's theory, did it apply to the different phenomena which these beds of toad-stone present. According to this theory, the beds of toad-stone must have been interposed subsequently to the formation of the metallic veins. There are, however, instances, in which very large veins extend from the lime-stone to some depth in the toad-stone, and terminate in small fringes of ore; in other instances, though the ore is not continued through the toad-stone, a small vein filled with spar may be traced from No. 1, the first lime-stone, through b, to No. 2, the second lime-stone. Such instances prove, in the most decisive manner, that the formation of the veins was posterior to that of the toad-stone. Hence we are led to seek for some other cause which may explain the absence of metallic ores in the beds of toad-stone. This subject will be considered when we treat of metallic veins. See TRAP, and VEINS, Mineral and Metallic.

From the experiments of Dr. Withering on this stone with different acids, alkalies, and by fusion, it appears that one hundred parts of it consist of 63½ parts of siliceous earth, 16 of calciform iron, 7½ of carcaseous earth, and 14 of earth of alum. The aggregate of these ingredients is found to weigh 15 parts more than the original mass, which is ascribed to the sublimate capable of uniting with fixable ore, not having been fully agitated with it, as they would be after their precipitation by the earth of alum. (Phil. Tranf. vol. lxxii. part ii. p. 353.) This sublinate differs little from that of haflets: it is fofter, contains a smaller proportion of iron, and a larger of flux.

TOAGAMALLY, in Geography, a town of Hindostan, in the Carnatic; 17 miles W.S.W. of Trichinopoly.

TOAHOUTA, one of the smaller Society islands, near Otaha.

TOAILREH, a town of Egypt, on the coast of the Red sea, where the water is salt; 5 miles N. of Koloum.

TOALDO, Joseph, in Biography, a distinguished philosopher, was born in 1719 at a small village near Marostica, in the valley of Vicenza, at the foot of the Alps, and sent, in the year 1733, to the seminary of Padua, where he studied Latin, rhetoric, philosophy, theology, and particularly mathematics. In this seminary he afterwards became a teacher of grammar, rhetoric, philosophy, and mathematics. His first literary work was a new edition of the writings of Galileo, to which he added several fragments never before published, with a preface and notes. For his services to the above-mentioned seminary he was recommended with the benefice of Montegada, which he enjoyed for 14 years, and which he exchanged for another more convenient, after his appointment by the senate of Venice, in 1762, to the professorship of astronomy and meteorology in the university of Padua. Here he constructed an observatory, begun in 1767 and completed in 1774. In 1769 he published at Padua a short view of plane and spherical trigonometry, entitled "Tavole Trigonometriche, &c," which was reprinted and used in many of the Italian seminaries. He next published a treatise on the influence of the heavenly bodies on the weather and atmosphere, containing the result of a long series of meteorological observations. This work, printed at Padua in 1770, 4to., was translated into different languages, and so well received, that he was admitted into various learned societies. About the same time he prefented to the public essays in favour of electrical conductors, which caused them to be erected in the Venetian territories; also a chronological view of uncommon changes in the weather, with tables of the state of the barometer, and the flux and reflux of the sea. His meteorological journal was begun in 1773, and continued till his death. His celebrity was augmented in 1774 by an answer to a prize question, proposed by the academical society of Montpellier, on meteorology applied to agriculture; and after this time he laboured incessantly in diffusing meteorological science. In 1777 he translated Lalande's Astronomical Tables, and his "Abridged de l'Astronomie," and some time after, his "Astronomie des Danes," erecting also in his observatory a marble bust of that eminent astronomer. From this time he almost restricted his attention to astronomy and meteorology, endeavouring to confirm his hypothesis of the influence of the moon on the different changes of the weather. He also published an historical view of the services rendered by the Venetian schools to astronomy, geography, and navigation. In 1783 he obtained, in conjunction with his nephew Chinnello, who was his assistant in the observatory, the prize offered for the best treatise on the construction of a comparative hygrometer; and in 1784 he published a small work on the longitude, which was well received. He proceeded regularly with his journal till the year 1787, when a small work in two sheets was printed at Venice; and in the following year his Tables of Vitality appeared at Venice and Padua. Of his travels in 1780 and in 1788, in the course of which he examined the place where Hannibal crossed the Alps, the result was inferred in his dissertation on the subject, printed in the fourth volume of the Transactions of the Academy of Padua. But our limits will not allow us to give even the titles of the numerous essays and papers which he published on various subjects, relating principally to meteorology. The journals of the period in which he lived contain many curious pieces contributed by this indefatigable inquirer into the operations and phenomena of nature. Besides his publications, he left in MS. several papers, and particularly observations on the travels of Marco Polo, and on the real epoch of the Chinese wall. The termination of Toaldo's life was accelerated by the chagrin which he felt, in consequence of a fruitless attempt to serve a young man who had been deprived of his office. This irritation affected his health, fo much that in November, 1797, he was attacked by a nervous affection, which in a few days proved fatal, in the 79th year of his age.

"Toaldo," says his biographer, "was of small stature; but, in general, had an engaging appearance that inspired confidence
TOBacco, Nicotiana, in Botany. See Nicoti
TIANA.

TOBacco, Culture and Preparation of. See Nicotiana.

TOBacco, History of. Tobacco was not known in Eu-
rope till after the discovery of America by the Spaniards,
and first imported about the year 1560, as some fry by Sir
Francis Drake.

The Americans of the continent call it petun, thone
of the islands yeh. The Spaniards, who gave it the name
tobaco, took it from Tabaco, a province of Yucatan, where
they first found it, and first learned its use; or, as Ione say,
it derived its name from the island of Tabago, or Tobaco.

The French, at its first introduction among them, gave
it various names; as Nicotiana, or the ambassadore's herb,
John Nicot, then ambassador of Francis Ill, in Por-
tugal; who brought some of it with him from Lisbon,
and presented it to a grand prior of the house of Lorrazin,
and to queen Catherine de Medicis; whence it was also called
queen's herb, and grand prior's herb. They also gave it
other names, which are now all reduced to the original
name of tobacco, or tobacco, from Tabaco, given it by Hern-
dez de Toledo, who first sent it into Spain and Por-
tugal.

It appears from Lobel, that this plant was cultivated in
Britain before the year 1570; and the introduction of the
practice of smoking it in England has been commonly
attributed to Sir Walter Raleigh, about the year 1584. The
cultivation of it is now common in various parts of the
globe; and though prohibited by the laws of this country,
the manufacture of it forms no inconsiderable branch of
commerce.

Tobacco might be cultivated with advantage through
the greater part of Europe; but almost in every part of Europe
it has become a principal subject of taxation; and it has
been supposed, that it would be more difficult to collect a
tax from every farm where this plant might happen to be
cultivated, than to levy one upon its importation at the
custom-house. The cultivation of tobacco has been, upon
this account, most ably, (says Mr. Smith, Wealth
of Nations,) prohibited through the greater part of Europe,
which necessarily gives a sort of monopoly to the countries
where it is allowed; and as Virginia and Maryland produce
the greatest quantity of it, they share largely, though not
without some competitors, in the advantage of this mono-
poly: the cultivation of it, however, is said to be less pro-
fitable than that of sugar. At the time when the author
published his work above cited, about ninety-five thousand
hogsheads of tobacco were annually purchased in Virginia
and Maryland, with a part of the surplus produce of British
industry; but the demand of Great Britain does not require,
perhaps, more than fourteen thousand. If the remaining
eighty-two thousand, therefore, could not be sent abroad
and exchanged for something more in demand at home, the
importation of them must cease immediately, and with it
the productive labour of all these inhabitants of Great Bri-
tain, who are at present employed in preparing the goods
with which these eighty-two thousand hogsheads are an-
ually purchased. Those goods, which are part of the pro-
duce of the land and labour of Great Britain, having no
market at home, and being deprived of that which they had
abroad, must cease to be produced. The most round-about
foreign trade of consumption, therefore, may, upon some
occasions, be as necessary for supporting the productive la-
bour of the country, and the value of its annual produce, as
the most direct. In order to facilitate the great exportation
which was necessary, for getting rid of that which remained
after the home consumption, the whole duties were drawn
back, provided the exportation took place within three
years.

The principal kinds of tobacco imported into England
are, as we have already observed, the Maryland, called
Oroonoko, and the Virginia-tobacco. The former is not
so agreeable to the British taste as the sweet-leafed tobacco
of the latter country; but the northern nations of Europe
are said to like it better.

Besides the tobacco of the West Indies, there are con-
siderable quantities cultivated in the Levant, the coasts
of Greece, and the Archipelago, the island of Malta, and
Italy. The marks of good twist tobacco are a fine shining
cut, an agreeable smell, and that it has been well kept.

In the island of Ceylon, there are two kinds of tobacco
cultivated for profit. They call both kinds dunkol,
which signifies a leaf, the use of which is to be smoked. The
one kind they call fingle dunkol or fingle dunkel, for they make
no difference between the letter s and H in their pronuncia-
tion; the other they call dunkol kappada; kappada signifies
gelding, and is a word of Portuguese origin. This kappada
烟acco is much stronger and more intoxicating than the
other; but both kinds are the produce of the same plant;
only the fingle tobacco has very little care taken of it, being,
after the fowling, in a manner left to itself; while the other
has great pains bestowed upon it during the whole time of
its growth, and till it is fit for use.

Some of the Ceylonese chew this strong tobacco with
their betel; and some, who smoke it alone, use no pipe,
but, taking a long leaf of it, they roll it up into a long
form, and cover it with the leaf of the witttan-ken; they
then light one end of it, and smoke by the other, till the
whole is consumed. Phil. Trans. N° 278, p. 1143.

Although in Russia tobacco is not considered as one of
the general necessaries of the lower classes of the people,
the practice of smoking having been held as a sin to the
end of the 17th century; nevertheless the consumption of it is
by no means small, and of course the importation always
much overbalances the exports. In 1793, the former at St.
Peterburg
Tobacco.

Peterburg alone amounted to upwards of 47,000 rubles; and the latter, from all parts of the empire, barely to 20,000: however, the consumption must have increased, as the education in 1768 is stated by Guldenfzdt at 21,000, and the whole of the importation at 108,000 rubles. The culture has been profitably carried on, since the year 1765, in various districts of the empire. Most of it is obtained in the Malo-Russian governments, where the cultivation was first encouraged; but it has been much cultivated in other regions, e.g. about the Volga and the Samara, and particularly by the Cossacks on the Orénburg and Siberian lines. The greatest part of the Russian tobacco is derived from American, and some Turkish and Persian seeds. In the generality of the southern governments, these plantations admit of being greatly multiplied. The different sorts of tobacco and snuffs prepared from it, which are now in use, are to be attributed to the difference in the climate and soil in which it grows, and the peculiar mode of managing and manufacturing the plant, rather than to any essential difference in its qualities.

Tobacco, in the Materia Medica, &c. This is a well-known drug of a narcotic quality, which it discovers in all persons, even in small quantity, when first applied to them; and when used in large quantities, its effects have sometimes been more violent, so as to have proved a mortal poison. Besides its narcotic qualities, it possesses also a strongly dilating power, perhaps, as Dr. Cullen observes, with respect to the whole system, but especially with respect to the stomach and intestines; so as readily, even in no great doses, to prove emetic and purgative.

The leaves of tobacco have a strong disagreeable smell, and a very acrid burning taste; distilled in a retort, without addition, they yield an acrid, empyreumatic, poisonous oil. They give out their acrid, matter both to water and spirit, but most perfectly to the latter: the aqueous infusions are of a yellow or brown colour, the spirituous of a deep green. The several sorts of tobacco imported from abroad are stronger in taste than that of our own growth, and the extracts made from them much more fiery, but in less quantity.

Tobacco has been employed, in ordinary use, by snuffing, smoking, and chewing; and these practices have been common for more than 200 years to all Europe, and they have more or less prevailed in other parts of the globe. Like other narcotics, the use of it may be introduced by degrees; and its peculiar effects may hardly at all be manifested; but beyond certain limits, violent effects have been sometimes produced on those who have been accustomed to the use of it. The power of habit is often unequal, even among those who have been addicted to this practice. Dr. Cullen mentions a lady, who had been for more than twenty years accustomed to take snuff at all times of the day; but she found at length that indulging much in the use of snuff before dinner took away her appetite; and in process of time, that a single pinch, taken any time before dinner, pulled her appetite for that meal. But when she abstained from the use of it, her appetite returned; and after dinner, for the rest of the day, she took snuff freely without inconvenience. When snuff, that is, tobacco in powder, is first applied to the nose, it proves a stimulus, and excites freezing; but by repetition, that effect entirely ceases.

Snuff, when first employed, if it be not taken in small quantity, and if it be not thrown out immediately by sneezing, occasions some giddiness and confusion of head: but these effects do not occur when persons are habituated to the use of it. But such persons, if it be taken beyond the usual quantity, experience the same consequences; and the effect is manifest, not only on the seneforium, but on other parts of the system, particularly the stomach, occasioning a loss of appetite, and other symptoms of a weakened tone in that organ. Dr. Cullen says, that he has observed several instances of persons who take snuff to excess, suffering from it by a loss of memory, by a fatuity, and by other symptoms of the weakened or feble state of the nervous system, induced before the usual period. He has also found symptoms of dyspepsia, and pains of the stomach, occurring every day, in consequence of excess in the practice of taking snuff. These symptoms have subsided, when the use of snuff has been discontinued. A special effect of snuffing, he says, is its exciting a considerable discharge of mucus from the nose; and there have been several instances of head-aches, tooth-aches, and opthalmia thus relieved: and when this discharge of mucus is considerable, the ceasing or suppression of it, by abstaining from snuff, is apt to occasion those disorders which it had formerly relieved. Another effect of taking snuff is this, that as a part of the snuff is often carried back into the fauces, so a part of this is carried down into the stomach, and then more certainly produces the above-mentioned dyspeptic symptoms.

Smoking, when first practised, shews very strongly the narcotic, vomiting, and even purging powers of tobacco, and it is very often useful as an anodyne; but by repetition these effects disappear, or only shew themselves when the quantity smoked is beyond what habit had before admitted of; and even in persons much accustomed to it, it may be carried so far as to prove a mortal poison. From much snufing, all the same effects may arise which we said might arise from the excess in snuffing.

With respect to the evacuation of mucus which is produced by snuffing, there are analogous effects produced by smoking, which commonly stimulate the mucous follicles of the mouth and fauces, and particularly the excretories of the salivary glands. By the evacuation from both sources, with the concurrence of the narcotic power, the tooth-ache is often greatly relieved by it; but we have not found the smoking relieve head-aches and opthalmia so much as snuffing often does. Sometimes smoking dries the mouth and fauces, and occasions a demand for drink; but, as commonly the stimulus it applies to the mucous follicles and salivary glands draws forth their liquids, it occasions on the other hand a frequent spitting.

So far as this is of the proper saliva, it occasions a want of that liquid so necessary in the business of digestion; and both by this want, and by the narcotic power at the same time applied, the tone of the stomach is often weakened, and every kind of dyspeptic symptoms is produced. Though in smoking a great part of the smoke is again blown out of the mouth, fill a part of it must necessarily pass into the lungs, and its narcotic power applied there often relieves spasmodic asthma; and by its stimulant power it there also sometimes promotes expec tionation, and proves useful in the catarhal or pithous difficulty of breathing.

Smoking has been frequently mentioned as a means of guarding men against contagion. In the case of the plague, the testimony of Dierensbroc is very strong; but Riviens and others give us many facts which contradict this; and Chenu gives a remarkable instance of its inability. We cannot indeed suppose that tobacco contains an antidote of any contagion, or that in general it has any antiseptic power; and therefore we cannot allow that it has any special use in this case: but it is very probable that this and other narcotics, by diminishing sensibility, may render men less liable to contagion; and by rendering the mind less active and anxious, it may also render men less liable to fear, which has
has so often the power of exciting the activity of the contagion. The antilomac powers of tobacco are therefore on the same footing with those of wine, brandy, and opium.

The third mode of using tobacco is that of chewing it, when it excites its narcotic qualities as strongly as in any other way of applying it; though the nauseous taste of it commonly prevents its being carried far in the first practice. When the practice, however, is continued, as it is very difficult to avoid some part of it dissolved in the saliva from going down into the stomach, so this, with the nauseous excitement of the taste, makes vomiting more readily occasioned by this than the other modes of applying it. They are the strong, and even disagreeable impressions repeated, that give the most durable and tenacious habit; and therefore the chewing of tobacco is apt to become one of the habits, and it is therefore in this way that it is ready to be carried to the greatest excesses, and to shew all the effects of the frequent and large use of narcotics. As it commonly produces a considerable evacuation from the mouth and face, so it is the most powerful in relieving the rheumatic affection of tooth-ache. This practice is also the occasion of the greatest waste of saliva; and the effects of this in weakening digestion, and perhaps from thence especially, its noted effect of producing emaciation, may appear.

The effects already recited of the different modes of employing tobacco depend especially upon its narcotic power, and certain circumstances accidentally attending its application to the nose and mouth; but as we have observed before, that beside its narcotic, it possesses also a stimulant power, particularly with respect to the alimentary canal: by this it is frequently employed as a medicine for exciting either vomiting or purging, which it does as it happens to be more immediately applied to the stomach or to the intestines.

An infusion of half a dram to a dram of the dried leaves, or of these as they are commonly prepared for chewing, for an hour or two, in four ounces of boiling water, affords an emetic which has been employed by some practitioners, but more commonly by the vulgar only. As it has no peculiar qualities as an emetic, and its operation is commonly attended with severe sickness, it has not been, nor is it likely ever to come into common practice with physicians.

By long boiling in water, its deleterious power is said to be abated, and at length destroyed; an extract made by long coction, is recommended by Stahl and other German physicians, as the most effectual and safe aperient, detergent, expectorant, diuretic, &c.; but the medicine must necessarily be precocious in strength, and has never come into use among us. Lewis Mat. Med.

It is more commonly employed as a purgative in gypsies; and, as generally very effectual, it is employed in all cases of more obdurate constiffines; and its powers have been celebrated by many authors. Dr. Cullen has known it to be in frequent use with some practitioners: and he adds, it is indeed a very effectual medicine, but attended with this inconvenience, that when the dose happens to be in any excess, it occasions severe sickness at the stomach, and it has been known to frequently occasion vomiting.

A strong decoction of tobacco, with proper carminatives and cathartics, given gypsy-wife, sometimes proves of good effect in what is usually called the stone colic, and also in the iliac passion.

It is well known, that in cases of obdurate constiffines, in ileus and incarcerated hernia, the fume of burning tobacco has been thrown into the anus with great advantage. The fume operates here by the fame qualities that are in the infusions of it above-mentioned; but as the fume reaches much farther into the intestines than infusions can commonly do, it is thereby applied to a larger surface, and may there-fore be a more powerful medicine than the infusions. In several instances, however, says Dr. Cullen, I have been disappointed of its effects, and have been obliged to have recourse to other means.

Bates and Fuller give some receipts, in which tobacco is an ingredient, with mighty encomiums, in allmatic cafes.

Hoffman observes, that horses have been often relieved by this remedy, but in human subjects it has been rarely tried; and says he has known some of the common people, who laboured under excruciating pains of the intestines, freed in an instant from all pain by swallowing the smoke. Both the decoction and the fume have not infrequently been injected in cafes of incarcerated hernia, and often with success. The fume thus applied is recommended as one of the principal means for the relaxation of perfolns apparently dead from drowning or other sudden causes; but some fupplement the narcotic power of tobacco as unfavourable in these cafes.

The infusion of tobacco, when it is carried into the blood-vessels, has sometimes shewn its stimulant powers exerted in the kidneys; and very lately we have had it recommended to us as a powerful diuretic of great service in dropsy. Upon the faith of these recommendations we have now employed this remedy in various cafes of dropsy, but with very little success. From the small doses that are proper to begin with, we have hardly observed any diuretic effects; and though from larger doses they have in some measure appeared, we have seldom found them considerable: and when, to obtain these in a greater degree, we have gone on increasing the doses, we have been constantly restrained by the severe sickness at the stomach, and even vomiting, which they occasioned: so that we have not yet learned the administration of this remedy, so as to render it a certain or convenient remedy in any cases of dropsy.

Tobacco is sometimes employed externally in ungents and lotions, for cleansing foul ulcers, destroying cutaneous infects, and other like purposes: it appears to be destruc-tive to almost all kinds of infects, to those produced on vegetables as well as on animals. Lewis.

A strong decoction of the stalks, with sharp-pointed dock, and salm, is said to be of good service, used externally, in cutaneous disfempers, especially the itch: some boil them for that purpose in urine. The same decoction is said to be efficacious in curing the mange in dogs.

Tobacco beat into a mash with vinegar or brandy, and laid on the stomach, has sometimes good effects in removing hard tumours of the hypochondria. We have the history of two cures made by such applications in the Med. Eff. Edinb. vol. ii. p. 41.

The juice of this plant is said to be good against ulcers and mortifications. Boyle's Works, Abr. vol. i. p. 56.

Some caution, however, Dr. Lewis observes, is requisite even in the external usofs of tobacco, particularly in solutions of continuity; there are instances of its being thus transmitted into the blood, so as to produce violent effects.

A drop or two of the chemical oil of tobacco being put on the tongue of a cat, produces violent convulsions, and death itself in the space of a minute; yet the same oil used in lint, and applied to the teeth, has been found of service in the tooth-ache; though it must be to those that have been used to the taking of tobacco, otherwise great sickness, retching, vomiting, &c. happen; and even in no cafe is the internal use of it warranted by ordinary practice. See experiments on the effects of oil of tobacco on pigeons, by M. Fontana, in which he found vomiting to be a constant effect of this poison, as he calls it, and the lots of motion
TOBACCO.

in the part to which it is applied an occasional or accidental effect, in Phil. Trans. vol. lxx. part i. append. p. 38, or Fontana fur les Poissons, &c. Florenc, quarto.

In cases of oblique ulcers, the infusion has been employed as a lotion with advantage; but the many infirmities of its being absorbed, and thus proving a violent poison, diffused from the practice; especially as there are other medicines of greater efficacy, that may be used more safely. Bergius recommends it to be employed as a fomentation in the paraphysis.

Sim. Paulii, physician to the king of Denmark, in an express treatise on tobacco, observes, that the merchants frequently lay it in hog-houses, to the end that, becoming impregnated with the volatile falt of the excrements, it may be rendered the brisker, more fetid, and stronger.

Amurath IV. emperor of the Turks, the grand duke of Moscovy, and the emperor of Persia, have prohibited the use of tobacco in their states. Our king James I. wrote a treatise expressly against it, entitled "A Counterblaff to Tobacco." By a bull of pope Urban VIII. such are excommunicated as take tobacco in churches.

TOBACCO. Laws and Regulations concerning.—Tobacco is not to be planted in England, on forfeiture of 40l. for every rod of ground thus planted; but this shall not extend to hinder the planting of tobacco in physic gardens, in quantities not exceeding half a pole of ground, and also on forfeiture of 10l. for every rod. (15 Car. II. c. 7. 12 Car. II. c. 34.) And justices of peace have power to issue warrants to confisables, to search after and examine whether any tobacco be fown or planted, and to destroy the fame, which they are to do under penalties, &c. 22 & 23 Car. II. c. 26. 5 Geo. I. c. 11.

The act of 29 Geo. III. c. 68, regulating the importation, exportation, and manufacture of tobacco and snuff, and also that of 30 Geo. III. c. 40, made to explain and amend the former, are fo extended, and comprehend so great a variety of particular regulations, as not to admit of minute recital in this place. The former repeals a considerable number of preceding statutes. By 49 Geo. III. c. 68. and c. 69. all duties under the respective departments of Customs and Excise are repealed, and other duties are granted in lieu of them. Tobacco and snuff are also subject to annual duties by the act for continuing the duties on pensions, offices, &c.; and certain drawbacks are allowed upon the exportation of them; which duties are to be under the management of the commissioners of the customs and excise. 43 Geo. III. c. 68. and c. 69.

No tobacco shall be imported but from America, on pain of forfeiture, with the vessel and its contents; except from Spain, Portugal, and Ireland, from which it may be imported under certain regulations. (29 Geo. III. c. 68.) But tobacco of the territories of Ruffia or Turkey may be imported from thence in British-built ships, and warehoused, and may be exported or entered for home consumption, on payment of the like duties as tobacco of the United States of America; and on its being manufactured in Great Britain and exported shall be entitled to the drawbacks. (43 Geo. III. c. 68.) By 45 Geo. III. c. 57. tobacco, the production of the West Indies or the continent of America, belonging to any foreign European state, may be imported into certain ports specified in the act, and exported to any port of the united kingdom, subject to the regulations of the act; and such tobacco shall pay the same duties as that which is the growth of the British West Indies, or of the United States of America. By 49 Geo. III. c. 25. unmanufactured tobacco may be imported from any place in British vessels navigated according to law, or in foreign ships navigated in any manner whatever belonging to any state in amity with Great Britain; and such tobacco shall be liable to the same regulations as tobacco from the British plantations.

But no tobacco or snuff shall be imported in any vessel of less burthen than 120 tons; nor any tobacco-stalks, tobacco-stalk flour, or snuff-work, in any vessel whatever; nor any tobacco or snuff in casks less than 450lbs. on the like penalty; except loose tobacco for the crew, not exceeding 5lbs. for each perchon; nor shall the vessel be forfeited, if proof be made from the smallness of the quantity that such tobacco or snuff was on board without the knowledge of the owner or master. 29 Geo. III. c. 68.

And no tobacco or snuff shall be exported except at London, Bristol, Liverpool, Lancaster, Cowes, Falmouth, Whitehaven, and Hull (and by 31 Geo. III. c. 47. Newcastle-upon-Tyne); on the like forfeiture. Every manufacturer of tobacco or snuff shall take out a licence from the officers of excise, for which he shall pay, if the quantity of tobacco and snuff-work, weighed by him for manufacture within the year, ending the roth of October previous to his taking out such licence, did not exceed — — — — 20,000 lbs. £ s. d. 2 0 0

If above 20,000 and not exceeding 30,000 3 0 0

30,000 — — 40,000 4 0 0

40,000 — — 50,000 5 0 0

50,000 — — 60,000 6 0 0

60,000 — — 70,000 7 0 0

70,000 — — 80,000 8 0 0

80,000 — — 90,000 9 0 0

90,000 — — 100,000 10 0 0

100,000 — — 120,000 12 0 0

120,000 — — 150,000 15 0 0

150,000 — — — — 20 0 0

Every person who shall first become a manufacturer of tobacco or snuff, shall pay for every such licence 2l., and within ten days after the roth of October next after taking out such licence, such further additional sum, as with the said 2l. shall amount to the duty herein before directed to be paid, according to the quantity of tobacco and snuff-work weighed for manufacture within the preceding year. — — 2 0 0 and a furchage.

And every dealer in tobacco and snuff shall take out a licence in like manner, for which he shall pay, within the liberties of the chief office in London, 5l., elsewhere 2l. 6d. 43 Geo. III. c. 69. Sched. (A.)

But perfons licensed as manufacturers, who shall not fell tobacco in a less quantity than four pounds, nor snuff in two pounds, need not be licensed as dealers. 29 Geo. III. c. 68.

Every person who shall manufacture or deal in tobacco or snuff without taking out such licence; or shall not renew the same ten days at leaft before the end of the year, shall forfeit, if a manufacturer, 200l., and if a dealer, 50l.

But no perfon shall be liable to the said penalty of 50l. for selling unmanufactured tobacco or snuff, whilst remaining in the king's warehouse.

But perfons in partnership need not take out more than one licence for one house.

Every person who shall manufacture tobacco, tobacco-stalks, or returns of tobacco, or flatten any tobacco-stalks, or
or cut the same into Spanish, shall be deemed a manufacturer of tobacco. And every person who shall grind or manufacture any tobacco-flake flour, snuff-work or snuff, shall be deemed a manufacturer of snuff. And every person who shall sell any tobacco, tobacco-flakes, or returns of tobacco, or flakes flattened or cut into Spanish, shall be deemed a dealer in tobacco. And every person who shall sell any tobacco-flake flour, snuff-work or snuff, shall be deemed a dealer in snuff, within the meaning of this act.

Every manufacturer and dealer shall make entry in writing of his house or place intended to be made use of for manufacturing, keeping, or selling tobacco or snuff, three days before he shall begin, on pain of forfeiting 200l., and also the tobacco and snuff there found, together with the casks and package, which may be seized by the officers of the customs or excise.

Every manufacturer, within the limits of the head office, must be an occupier of a tenement of 10l. a-year, and pay to the parish rates; elsewhere, he must pay to the church and poor.

Every such manufacturer shall, three days before he begins, make entry in writing at the excise-office of all mills, presses, engines, rollers, flouses, mullers, or spinning-wheels, intended to be used by him about the manufacturing of tobacco or snuff; on pain of forfeiting 50l. for every such utensil not entered.

Every such manufacturer and dealer shall cause to be put up in large legible characters over his door, or on some conspicuous part of such house or place, the words Manufacturer of, and Dealer in Tobacco and Snuff, or Tobacco or Snuff, or Manufacturer of, or Dealer in Tobacco and Snuff, or Tobacco or Snuff (as the case may be); on the penalty of 50l.

If any person, who has not made such entry as aforesaid, shall put up the said words, he shall forfeit 100l.

And by 30 Geo. III. c. 40, no person shall set up or begin any manufactory of tobacco or snuff within five miles of the sea-coast, except in the ports and places aforesaid, where tobacco may be imported, or places within three miles thereof; or in cities, or the suburbs thereof, and market-towns; and no entry thereof shall be of any avail. But the same shall not extend to places duly entered before the 5th of July, 1789.

But tobacco and snuff may be manufactured by any unlicensed Spanish cutter or snuff-miller at any entered mill, on account of any licensed manufacturer, provided the same be legally permitted from such manufacturer, and for the sole purpose of manufacturing or grinding. 29 Geo. III. c. 68.

Every manufacturer shall give notice in writing to the officers (if in London fix, in cities and market-towns twelve, and elsewhere twenty-four hours), before he shall begin to strip, spin, or press any tobacco for cutting; or make any tobacco into carrots, or flatten any flakes for Spanish; and shall express therein the weight of each article, and the time he intends to begin; and the officer shall attend accordingly, and he shall begin within one hour of the time so mentioned, and shall proceed without delay; and shall afterwards deliver a declaration in writing to such officer, of the quantity intended to be used for each fort of tobacco; on the penalty of 20l. and such notice being void.

30 Geo. III. c. 40.

Provided, that if such tobacco shall afterwards appear to be unfit for the purpose specified in such declaration, it may be applied to any other purpose, on giving 48 hours' notice to the officer of the fort: it is intended for.

Such manufacturer, as soon as the manufacturing is finished, shall deliver to the officer a declaration of the weight of the different sorts of tobacco so manufactured, and the number of the rolls or carrots made, and the weight thereof, and of the tobacco-flakes and returns arising from the operation; and shall keep each fort separate for twenty-four hours, or until an account be taken; on the penalty of 50l.

If any manufacturer shall make, or have in his possession, any roll or carrot tobacco for exportation, which shall have any tobacco-flakes therein, the same shall be forfeited, and may be seized, and he shall also forfeit 50l.

Every person who shall cut any walnut-tree, or other leaves, herbs, or plants, in imitation of tobacco (not being tobacco-leaves or plants); or shall colour the same so as to resemble tobacco; or shall mix any such leaves, herbs, or plants with tobacco; or shall fell, or expel to false, or have in his possession any such leaves, herbs, or plants so cut, coloured, or mixed, shall forfeit the same with the casks and package, which may be seized; and also 200l.

Provided, that nothing herein shall extend to prohibit any such manufacturer from dyeing tobacco, or for having such dye in his possession for that purpose. 30 Geo. III. c. 40.

Every manufacturer of snuff shall provide proper moveable casks for preparing, laying down, or putting into bins snuff-work and tobacco-flakes for flour; and shall place them so as that the officer may conveniently examine and weigh the same at all times; and shall mark every such cask with a progressive number, the same being, and the care and weight thereof; and shall not lay down any snuff-work in any cask not so marked; nor put the same in any bin; on the penalty of 50l. 29 Geo. III. c. 68.

Such manufacturer of snuff shall, before he begins to liquor, or cut any tobacco or flakks, &c. or to lay down any snuff-work, give like notice as aforesaid to the officer, and shall in such notice declare the weights thereof respectively, and the number of each particular cask or bin in which the same is intended to be laid down; and such officer shall attend accordingly; and such person shall begin within one hour of the time so mentioned, and shall without delay proceed therein, until the whole is weighed; and shall then deliver an account in writing of the quantity intended for each fort of snuff or flour; and when put into casks, he shall give a like notice, and in the presence of the officer shall affix to each cask a ticket specifying the number of such casks, and the weight of the snuff-work, &c. therein, and the time when laid down, and what sort of snuff it is intended for; which ticket shall be signed both by such manufacturer or his servant and the officer; and when the same is intended to be taken out to be ground, like notice shall be given, and the same shall be weighed out in the presence of such officer. And no such manufacturer shall mix snuff-work or tobacco-flakes for flour of one making with another; on pain of forfeiting for every offence aforesaid 50l.

Provided always, that if such snuff-work shall afterwards appear to be unfit for the purposes specified in such declaration, or be intended to be manufactured contrary thereto, notice thereof in writing shall be given to the officer within forty-eight hours after the delivery of such declaration, and if such declaration shall be given, specifying the sort it is intended for, and such manufacturer shall proceed therein in manner as aforesaid. 30 Geo. III. c. 40.

Scotch snuff and tobacco-flake flour may be manufactured into brown Scotch snuff, and tobacco-flake flour into rappee snuff, subject to the regulations aforesaid. And on taking
Tobacco.

Stock, certain credits shall be allowed, as set forth in the act; and if on taking such stock any excess be found, the same shall be forfeited, and may be seized. 30 Geo. III. c. 40.

And to snuff-work in operation, tobacco, tobacco-flafls, or flour, or returns of tobacco, may be added, on giving to the officer, previous to such increase being made a like notice, and conforming to the regulations specified in the act.

The whole of any parcel of snuff-work in cure, may be mixed with the whole of any other parcel in cure, although laid down at different times, if the same be mixed in the presence of an officer, to whom notice is to be given as aforesaid.

If any manufacturer has occasion to supply his customers with manufactured tobacco or snuff from any parcel in operation, before the whole be finished, he may, in the presence of an officer, take for the purpose aforesaid any manufactured tobacco or snuff not less than 200 lbs. But if taken without conforming to the regulations specified in the act, he shall forfeit 5s.

And every manufacturer shall diligently manufacture such snuff-work, and flasks for flour, when taken out of such casks, according to the notice given; and when the same is finished, he shall deliver to the officer a declaration in writing of the weight of each for produced, and shall keep the same separate for twenty-four hours, or until the officer shall have taken an account thereof; on the penalty of 50/. 29 Geo. III. c. 68.

Every manufacturer may have a store-room for keeping dried Scotch snuff, but the same shall have but one door or opening, which shall be locked, sealed, and secured by the officer; wherein may be deposited Scotch snuff returned directly from the mill for six months, without being taken as part of his stock. And when the same is intended to be taken out of such room, notice shall be given to the officer, who shall attend and open such room, and such snuff shall be taken out in his presence; and shall be kept separate one making from another; on the penalty of 50/. And if any manufacturer shall open such store-room, except in the presence of an officer, he shall forfeit 200/. Every person, who shall cut any walnut, hop, fycamore, or other leaves, or any other herbs, plants, or materials (not being tobacco-leaves or plants); or shall colour or cure any such, to make the same ressemble tobacco; or shall sell the same, mixed or unmixed, for tobacco;—shall forfeit 5s. a pound, half to the king (charges of the prosecution first deducted), and half with full costs to him who shall sue. 1 Geo. I. st. 2. c. 46.

Every person who shall make, mix, or colour any snuff with ocher, umber, or other colouring, except water tinged with Venetian red only; or shall mix with any fugitive or yellow ebony, touchwood, or other wood, or any dirt, sand, or small tobacco sifted from tobacco,—shall forfeit the same, and 5l. for every pound weight, half to the king, and half to him that shall sue. 1 Geo. I. st. 2. c. 46.

5 Geo. I. c. 11.

And all such leaves and other materials, and all engines, utensils, and tools for working the same, may be searched for and seized, by warrant of three commissioners of the treasury or of the customs. 1 Geo. I. st. 2. c. 46.

If any person shall mix any fugitive, or other wood, or any leaves, herbs, or plants (other than tobacco), or any earth, clay, or tobacco-fand, with any snuff-work or snuff; or shall colour the same with any fort of colouring (water tinged with colour only excepted); he shall forfeit 200/. And if any manufacturer or dealer in snuff shall fall, or expose to sale, or have in his entered premises, any fugitive, yellow ebony, touchwood, logwood, red or Guinea wood, Brazilletto or Jamaica wood, Nicaragua wood, or Saunders wood; or any walnut-tree, hop, or fycamore-leaves; or shall have in his possession any of the aforesaid articles; or any other wood, leaves, herbs, plants, earth, clay, or tobacco-fand, mixed with any snuff-work or snuff; or such snuff-work or snuff-coloured (except as aforesaid); he shall forfeit 50l., and the same shall be forfeited, and may be seized. 29 Geo. III. c. 68.

Any manufacturer of British rappee, Scotch or brown Scotch snuff completely finished, and of which an account has been taken by the officer, may liquor the same, before mixing with snuff of a different making, so as it exceed not the legal credit. And if such manufacturer shall intend to liquor snuff, for which the legal credit has not been received, he shall give notice thereof to the officer. But no snuff shall be liquored in less parcels than 200lbs., nor in more than four different parcels of one making. 30 Geo. III. c. 40.

Snuff, for which such allowance shall have been made, shall be kept separate from all other snuff, and shall be shown to the officer on demand; on the penalty of 20l.

Every manufacturer and dealer, who shall mix Spanish with short cut tobacco, or any tobacco-flafls flour with snuff, or snuff of different sorts the one with the other, shall every day enter in a book or paper, the quantity sold, sent out, or confumd of two pounds or upwards, and the gross weight thereof, and the time when mixed; on pain of forfeiting 50l. 29 Geo. III. c. 68.

When any officer shall discover that the manufacturing of tobacco or snuff is carried on in any unentered place, and that any perfon knowingly alkalts, or is in any ways concerned in carrying on the same, every such perfon shall forfeit 50l. over and above all penalties and forfeitures that the proprietor thereof shall be liable to; and such officer or his assignat, may stop and arrest such perfon, and convey him before a justice, who, on his confession, or the oath of one witness, may convict such perfon of discovered, who shall immediately pay the said penalty to such officer or perfon who brought him; and if not so paid, such justice shall commit him to the house of correction to hard labour for five months from the day of conviction, or until the said penalty be paid. And for a second offence, he shall forfeit 60l., which, if not paid in manner aforesaid, he shall be committed in like manner for one year, or until such penalty be paid.

The offices of excise (between five in the morning and eleven in the evening without a conftable, and between eleven in the evening and five in the morning with a conftable) may enter into any house or place belonging to or made use of by any manufacturer or dealer, and take an account of the stock found therein; and shall give credit (as particularly fet forth in the act). And if at any time any exceeds in stock shall be found, of which no notice has been given to the officer, unless received by permit, the same shall be deemed and taken to be brought in without permit.

Every manufacturer and dealer shall keep sufficient scales and weights for the use of the officers, on the penalty of 100l. And if any such perfon shall, in weighing, use any art or device to prevent such officer from taking a true weight of such tobacco, &c. he shall forfeit 200l. together with such scales and weights, which may be seizes.

And every such manufacturer and dealer shall with a sufficient number of his servants affit such officer in taking such account of stock, on pain of forfeiting 50l.
TOBACCO.

But no officer shall weigh any tobacco, tobacco-stalks, or snuff-work, whilst actually in the operation of manufacture; except snuff-work intended to be sent out or received by permit.

And unmanufactured tobacco, tobacco in the state of operation, and manufactured tobacco, shall be kept separate from each other; on the penalty of 50l.

The officers shall be permitted to take samples of tobacco or snuff, &c. in the possession of any manufacturer or dealer, paying for the same (if demanded) the value or usual price; on the penalty of 100l. upon refusal.

Every manufacturer and dealer shall, in a book or paper, to be furnished by the officers, keep an account of all tobacco, &c. and snuffs which he shall have sold, sent out, or consumed the preceding day, in quantities of 4lbs. or upwards, of tobacco, &c. and 2lbs. or upwards of snuffs; and also another book or paper in like manner, if under 4lbs. of tobacco, &c. of 2lbs. of snuffs. But no such person shall have more than one such book or paper of each sort at the same time, which is to be returned to the officer, if in London, or any city or market-town every six weeks, elsewhere every six months, or when the same is filled up or demanded; and shall be verified on oath. And such books and papers shall lie open for the inspection of the officer, and shall be made up at his request; on the penalty of 100l. for every offence.

If any officer shall discover any increase in stock not legally accounted for, the same shall be deemed and taken to be made by a commodity, for which no duty has been paid, and privately brought in without permit; and such increase shall be forfeited, and may be seized; and the person, in whose stock such increase shall be found, shall also forfeit 2ol.

But Scotch snuff, in the custody of a manufacturer or dealer, not having gained more than 5lbs. in the 10lbs. by the moisture of the air, shall be deemed a fair commodity, and such person shall have credit for the same in his stock, and may remove the same by permit. And such snuff shall be kept separate from all other snuff, and shewn to the officer upon demand; on the penalty of 2ol.

If any manufacturer shall remove any tobacco or snuff out of his entered house or place, before the same has been weighed, and taken an account of by the officer, or shall hide or conceal the same from the view of such officer; he shall forfeit 50l.

And no tobacco (except returns) of 4lbs. and upwards, nor snuff of 2lbs. and upwards, nor any tobacco-stalks, Spanish returns of tobacco, tobacco-stalks for flour, snuff-work, or tobacco-stalk flour, exceeding 200lbs. shall be removed by land or water without a permit, on pain of forfeiting the same, with the casks and package, and also the horses, cattle, boats, barges, and carriages used in conveying the same, which may be seized.

Such officer on request shall grant permits, wherein shall be limited the time for such removal; and if the goods permitted shall not be delivered within the time so limited, the same shall be deemed and taken to be removed without permit.

But no permit shall be granted or be valid for the removal of any snuff-work from one part of the kingdom to another except from the entered premises of a manufacturer of snuff, where the same was laid down to the mill for the purpose of grinding; on forfeiture thereof, together with the horses, cattle, boats, barges, and carriages, which may be seized. 30 Geo. III. c. 40.

And no such permit shall be granted or be valid, unless the request note from such manufacturer or dealer contain the particulars specified in the act, and such permit to correspond with the request note; and if for removing unmanufactured tobacco (other than samples), except the same be in the original package, and be removed according to the regulations specified in the act: and all tobacco, &c. removed contrary thereto shall be forfeited, together with the casks and package, and the horses, cattle, boats, barges, and carriages used in the removal thereof, which may be seized. 29 Geo. III. c. 68.

Provided always, that permits may be granted for the removal of any unmanufactured tobacco, in any quantity not less than 200lbs. in any package whatsoever, from the entered premises of any manufacturer to any mill to be manufactured, and back to such entered premises. 30 Geo. III. c. 40.

And every manufacturer of tobacco or snuff may manufacture their tobacco, tobacco-stalks, snuff-work, and returns of tobacco, at any entered mill, and may remove the same by permit to and from such mill.

Provided, that nothing herein shall extend to prevent any manufacturer from flowing or finishing tobacco, or drying snuff-work at any mill, provided the officer be allowed to weigh and take an account thereof. 29 Geo. III. c. 68.

Where any permit shall be granted for the removal of any tobacco or snuff, &c. and the same shall not be removed agreeable thereto, such permit shall be returned before the expiration of the time limited for such removal; on forfeiture of treble the value of such goods. And where such permit shall not be so returned as aforesaid, and on taking stock a decrease does not appear to answer the contents of such permit, a like quantity shall be forfeited, and may be seized.

No manufacturer, unless licensed as a dealer, shall have a permit for, or shall sell or send out, any manufactured tobacco, Spanish, or returns of tobacco, in a less quantity than 4lbs., nor snuff than 2lbs.; on the penalty of 2ol.

No tobacco, &c. or snuff, &c. shall be brought into any house or place of a manufacturer or dealer without a permit, and also notice thereof shall be given to the officer; on pain of forfeiting the same, together with the casks and package, which may be seized, and such manufacturer or dealer shall also forfeit treble the value thereof.

No tobacco or snuff, &c. shall be removed from any place without the limits of the bills of mortality or excise office in London, to any place within those limits; nor from any place without the limits of the ports herein before enumerated to any place within, or within two miles of those limits; on forfeiture thereof, with the casks and package, and also the vessels, horses, cattle, and carriages employed in removing the same, which may be seized. But the same shall not extend to the legal removal of the several articles specified in the act.

By 30 Geo. III. c. 40. tobacco-stalks stripped from the leaf may be removed, by permit, from any entered premises out of the limits of the bills of mortality, to any place within those limits, subject to the regulations in the aforesaid act, and this act specified.

Any manufacturer or dealer, who hath received into his stock, by permit, any tobacco or snuff, may return the same within forty-eight hours to the person from whom he received it under certain regulations. But if found returned, or re-collected or sold, or shall not be the same identical tobacco or snuff which had been received, without any alteration; the same shall be forfeited, with the casks and package, which may be seized, and the person who shall return the same shall also forfeit 50l. 29 Geo. III. c. 68.
Tobacco

If any tobacco of 4 lbs. or upwards, or snuff of 2 lbs. or upwards, or any tobacco-flasks, &c., shall be found removing, unless between seven in the morning and five in the evening from 25th Sept. to 25th March, and between five in the morning and seven in the evening from 25th March to 25th Sept. (except by a common carrier or vessel which usually goes out of these hours,) the same shall be forfeited, with the cases and package, and the horses, carriages, and vessels made use of in conveying the same, which may be seized, whether the same be accompanied with a permit or not.

If any person whatsoever without a permit, or hawkers with one, shall offer any tobacco, &c., to sale, he shall forfeit the same, together with the package, and also 2s.

And the person to whom it shall be so offered to sale, may seize the same, and carry it to the next warehouse belonging to the customs or excise, and shall bring the person so offering it to sale before a justice, who shall commit him to prison, that he may be prosecuted for such penalty; and the person so assisting the same shall be entitled to the same rewards as the officers of the customs or excise; and in case such person shall defile it, the commissioners may cause three pence for every pound of tobacco, &c., so forfeited to be paid to him, till the same be disposed of, upon a certificate under the hand and seal of such justice, of such offender being committed to prison; and after sale, the money so advanced shall be replaced out of the produce of such sale.

If any person shall counterfeit or forge any permit, he shall forfeit 501.

If any person shall assault, refuse, oppose, molest, obstruct, or hinder any officer in the due execution of this or any other act; or shall rescue any goods which have been seized; or any vessel, horses, cattle, or carriages, which have been forfeited, and for which no particular penalty is provided; he shall forfeit 201.

If any person shall give or offer any bribe, recompense, or reward to any officer to prevent him doing his duty, whether the same be accepted or not, he shall forfeit 501.

No tobacco, snuff, &c. shall be landed, without first making entry thereof with the officers of the customs, on forfeiture thereof, with the cases and package.

If any officer of excise shall have cause to suspeét that any tobacco, &c., or snuff, which shall have been imported contrary to this act, or forfeited by this or any other act, is deposited, lodged, hid, or concealed, if within London or Westminster, or the limits of the chief office, upon oath made before two commissioners, elsewhere upon oath made before one justice setting forth the ground of his suspicion, such commissioners or justice may, by warrant, authorize such officer by day or night, but if in the night, in the presence of a constable, to enter into such suspected place, and to seize and carry away all such tobacco, &c., or snuff which shall be there found, together with the cases and package containing the same. And if any person shall obstruct or hinder any such officer so authorized, or person assisting him in the execution of such warrant, he shall forfeit 100l.

Tobacco and snuff, taken as prize, are subjected to the regulations of this act, by 43 Geo. III. c. 134.

No manufacturer or dealer in tobacco or snuff, or person anywise interested or concerned therein, shall act as a magistrate in the execution of any act relating to tobacco or snuff; and all acts done by such person shall be utterly null and void.

If any tobacco-flasks or items, stripped from the leaf, that are imported, shall be forfeited and burned, and the officer seizing the same shall be allowed one penny for each pound; and every person, who shall be assisting or otherwise concerned in unshipping the same, or to whose hands they shall knowingly come after unshipping, shall forfeit treble value, together with the vessels, bags, casks, or other things, wherein the same are contained, and the horses, cattle, carts, and other carriages, made use of in removing the same; half to the king, and half to such officer of the customs, who shall seize, inform, or sue for the same.

12 Geo. c. 28. 5 Geo. III. c. 43. 8 Geo. c. 18.

All seizures of vessels or boats of 15 tons or under, and of horses or other cattle and carriages, by virtue of any act relating to the customs, may be prosecuted, heard, and determined, before two justices residing near where the seizure was made. 8 Geo. III. c. 18. 5 Geo. III. c. 43. 29 Geo. III. c. 68.

And all penalties and forfeitures in the excise may be pursued for, levied, and mitigated as by the laws of excise, or in the courts of Westminster, half to the king, and half to him who shall sue (unless otherwise particularly directed.) 29 Geo. III. c. 68. 30 Geo. III. c. 40. 43 Geo. III. c. 69.

Tobacco-flasks or items, stripped from the leaf, that are imported, shall be forfeited and burned, and the officer seizing the same shall be allowed one shilling for each pound; and every person, who shall be assisting or otherwise concerned in unshipping the same, or to whose hands they shall knowingly come after unshipping, shall forfeit treble value, together with the vessels, bags, casks, or other things, wherein the same are contained, and the horses, cattle, carts, and other carriages, made use of in removing the same; half to the king, and half to such officer of the customs, who shall seize, inform, or sue for the same.

12 Geo. c. 28. 5 Geo. III. c. 43.

By 24 Geo. II. c. 41. and 26 Geo. II. c. 13. no tobacco or flasks exceeding 24 lbs. weight, nor any snuff exceeding 10 lbs. shall be conveyed by land, without proper certificates, under penalty of forfeiture, together with horses and carriages, and commitment of the carrier to the county-gaol for one month by one justice. The seizure of horses and carriages may be determined by two justices near the place where the seizure was made.

Tobacco, English, Nicotiana minor, or Nicotiana rustica of Linnaeus, is a species of tobacco, which was originally a native of America, but now propagates itself plentifully in England and other parts of Europe. The flowers are of an herbaceous yellow colour, appearing in July, and are succeeded by roundish capsules filled with small seeds, which ripen in autumn. The leaves are said by some to be of the same quality with those of henbane; but by others, to be similar to the preceding, but weaker. They have been sometimes substitutted in our markets, instead of the true tobacco; but are easily distinguished by their smallness and oval shape, and by being furnished with pedicles.

Lewis.

Tobacco, Kaanus. See Kanaster.

Tobacco-Water, among Sheep-Farmers, a liquor prepared by infusing or boiling tobacco in water. A very useful mode of preparing it is, by boiling one pound of tobacco in two gallons of strong salt brine, adding, after the liquid has become cool, about three ounces of the oil of turpentine. It is sometimes, too, the practice to dissolve fifteen or twenty grains, or more, of sublimate or muriated quicksilver in the turpentine, before it is added to the liquor or mixture. A small proportion of corrosive sublimate, dissolved in spirits of wine, is also a safe and next mode of incorporating it with the tobacco-water or liquid.

Tobacco-water, or liquor, is likewise occasionally mixed with other substances; as two pints of it have sometimes three ounces of sulphur mixed in them, being put on a fire until they boil together. The liquor is used in a cold state.
The South Down sheep-farmers have a decoction of tobacco, wildvine-root, and sulphur, which is boiled in brine for a quarter of an hour, and then strained off for use.

Tobacco-water, or liquor, is kept ready prepared for the use of farmers in many places where sheep are largely kept, but it is probably the best way for them to provide their own.

This water, or liquor, is a powerfully efficacious remedy in various cases of the scab kind in sheep, and probably in other animals. It is usually applied by shedding or dividing the wool by the fingers and thumbs, and pouring a little of the liquid in along it. It may be used every night, as there may be occasion. Such diseases are readily removed by it in mott cases, and especially in long-wooled sheep, in which they often take place.

In gardening, the simple water, or liquor, which is prepared by infusing or boiling tobacco in soft water, without any admixture, or having any such fulminations as above dissolved in it, is often found beneficial in destroying and removing insects of different kinds on fruit-trees and fruit-shrubs, by having it repeatedly sprinkled over them by means of a watering-pot, or dew-lyring, or in any other way. Many forts of these trees and shrubs in hot-houses, and other places, are treated in this manner with great effect and advantage in clearing them of such vermin.

Tobacco Key, in Geography, a small island in the bay of Honduras, near the coast of Yucatan. N. lat. 16° 45'; W. long. 88° 35'.

Tobacco-Pipe. See Tobacco Pipe.

Tobacco-Pipe Clay. See Cimolite.

Tobacco-Pipe Fish, in Ichthyology, the English name of the Acanthorhynchus Acanthorhynchus; which see.

TOBACHTLI, in Ornithology, a name which Nieremberg says is often given to the American bird more commonly called beauth.

TOBAGO, in Geography, one of the Caribbee islands, in the West Indies, about 30 miles in length from south-east to north-west, and about nine in breadth. This island was first discovered by Columbus, in the year 1498; but though projects were formed for settling it, particularly by William, earl of Pembroke, who obtained a grant of it in the year 1628, and also of Barbuda and St. Bernard, they proved ineffectual. About the year 1632, some Zealander, having fitted out a small squadron for trading to those islands, made such a favourable report of this in particular, upon their return home, that the company of merchants to which they belonged undertook to settle it, and gave it the name of New Walcheren, from one of the islands in Zeiland. The new colony, in a short time, increased to about 200, who, finding themselves pestered by the visits of the Caribbee Indians, began to erect a fort for their preservation. The Indians had reconnoited to the Spaniards, who readily granted them assistance. They sent a force upon the island which demolished the rising fort, and exterminated the new colony. It was probably from some Dutch merchants who travelled to Courland, that James, duke of that country, conceived the design of settling Tobago. Being a prince of an active disposition, and finding there was room for such a settlement, he sent over a colony of his own subjects, who settled upon what has since been called Great Courland Bay, and erected a small regular fort, with a town, in the neighbourhood, and the duke's title was further confirmed by a grant from Charles II. king of England, but disputed by the Dutch. Upon the extinction of the Kettler family, dukes of Courland, in the person of Ferdinand, son of duke James, the title of the island of Tobago reverted to the crown of England in 1737. By the treaty of Aix-la-Chapelle in 1748, St. Vincent, Dominica, St. Lucia, and Tobago, were declared neutral, and those who remained of the ancient proprietors were left in unmolested possession. By the 9th article of the peace of Paris, signed on the 10th of February, 1763, the three islands of Dominica, St. Vincent, and Tobago, were assigned to Great Britain, and St. Lucia to France; the Charrabes not being mentioned in the whole transactons, as if no such people existed. The climate of Tobago is far more temperate than could be expected in an island that is but 16 degrees 16 minutes north from the equator; for the heat is allayed by the sea-breezes. Tobago has another favourable circumstance to recommend it, by its lying out of the track of those hurricanes that prove so fatal to the other West India islands. The surface of the island is unequal and agreeably diversified; but no part of it is rugged or impaasible, though its north-west extremity is mountainous. Its soil is of different kinds, but in general the mould is rich and black, and proper for producing, in the greatest plenty, whatever is raised in other parts of the West Indies. The abundance of springs upon the island contributes to its healthfulness, and its bays and creeks are so disposed as to be very commodious for all kinds of shipping. Its situation, however, requires fortifications to render the island secure against the visits of favaxes and enemies. Besides its producing the different kinds of wood that are to be found in the other West India islands, the Dutch affirm, that both the true nutmeg-tree and the cinnamon-tree, with that which produces the real gum copal, grows upon the island, but this assertion wants confirmation. Mr. Blome, who, in 1687, wrote "The present State of our American Islands," says that the soil of Tobago produces Indian corn, Guine corn, peas, beans, French beans, figs, pineapples, pomegranates, oranges, lemons, limes, plantains, bananas, grapes, guavas, tamarinds, prickly pears, papaws, and a variety of other fruits, which are not to be found in Europe. The cocoa-tree grows here to such perfection, that the Indians call it God's tree, as producing both meat, drink, and clothing. Mulk-melons, water-melons, gourds, cucumbers, and pommions, are raised to perfection; neither is there any want of potatoes, yams, carrots, turnips, parnips, onions, and manioc. Wild hogs abounded so much in Tobago, that the people killed at least twenty thousand of them every year without their being feebly diminished. Here are likewise found peecars, remblowing fwee, armillaces, guavos, Indian rabbits, and badgers. Horses, cows, afes, fiepe, deer, goats, and rabbits, were probably introduced by the Dutch, and have multiplied exceedingly. The sea is florid with excellent fish, particularly turtle of every kind, and mullets of a most delicious taste, with other kinds unknown in England. In short, the commodities which the country doth, or may produce, are cocoa-nut, fugar, tobacco, indigo, ginger, farfaparilla, sempervivum, bees'-wax, venellos, natural balm, balm, folk-grafs, green tar, soap-earth, with many curious shells, flones, marcellites, and minerals. In 1791, the island was surrendered to the French on favourable terms. In 1793, it was again taken by the French, and finally retaken by the British. N. lat. 11° 30'; W. long. 62° 30'.

TOBAK, Little, a small island near the coast of Tobago, about two miles long, and one broad.

TOBAK, a town of European Turkey, in Beffarabia, on lake Jalaj. In 1789, the Russians were defeated by the Turks, near this town; 34 miles N.N.W. of Ismail.

TOBAN, a town of the island of Cuba; 16 miles N.E. of Trinidada.
TOBAR, a town of Spain, in Old Castile; 18 miles from Burgos.

TOBATA, in Ancient Geography, a town of Aisa, in the interior of Paphlagonia.

TOBATI, in Geography, a town of Paraguay; 50 miles N.E. of Asumption.

TOBED IUGARLETDEGH, a river of New Brunswick, which runs into the St. John, N. lat. 46° 50'. W. long. 67° 30'.

TOBIANUS, in Ichthyology, a name given by Schonefeldt to others of the ammodytes, or sand-eel.

TOBIRA, or TOBERA, in Botany, a Japanese shrub, figured and described by Kämpfer; see Pittosporum, p. 2. See also EUNOMUS, where its ill-agreement with the latter genus is noticed.

TOBIS, in Ichthyology, a name given by the Swedes to the ammodytes, or sand-eel.

TOBITSCHAU, or Towaczow, in Geography, a town of Moravia, in the circle of Olmutz; 10 miles S. of Olmutz. N. lat. 40° 23'. E. long. 17° 14'.

Tobiis, in Ancient Geography, a river of the isle of Albion, the mouth of which is placed by Ptolemy on the western coast, between the promontory Ofaptorum and that of Ratolathybius.

TOBLER BACH, in Geography, a river of Wurttemberg, which runs into the Glatt, 2 miles N.W. of Sultz.

TOBLPAD, a town of the duchy of Stidia; 8 miles S.W. of Gratz.

TOBOL, a river of Russia, which rises in N. lat. 52° 30', and long. 81°, in the country of the Kirghiz, in the chain of mountains that parts it from the government of Upha. It pours itself into the Irtysh or Irtich at Tobolliks, after running a course of about 500 versts, in which it receives the following rivers: viz. the Ul, the Iet, the Tura, and the Tadv, all which fall into it on the left. Of these, the Tura is the largest; it rises near Verkhoturia, in the Ural mountains, and glides into the Tobol, in lat. 57° 30', after having taken up the rivers Salda, Tagil, Pyshma, Nitza, &c. into which last-mentioned, the Neiva, the Aeth, and the Iribat flow. By this accession of waters, the Tura becomes a considerable river, not much inferior to the Tobol itself. The Iet is likewise a river of some consequence, rising out of a lake two versts from Ekatarinburg; and after having taken up several rivers, as the Siferit, the Sinava, the Tetha, and the Mises, falls into the Tobol, in N. lat. 57°. The Tobol has only low shores; and in the spring season frequently shad its waters far around.

TOBOLOVO, an otfrog of Ruffia, in the government of Tobolliks, on the Enisei. N. lat. 69° 40'. E. long. 86° 42'.

TOBOLSK, a city of Ruffia, and capital of a government, at the confluence of the Irtich and Tobol. It is the see of an archbishop, and was herefore the capital of all Siberia. This city is divided into the Upper and Lower Towns. The Upper Town stands very high, on the east side of the Irtich; and the Lower Town lies on a plain, between the hill on which the former is built, and the river. Both towns taken together are of a very large circumference; but the houses being mostly built with wood, it was nearly consumed by fire about the year 1780, and afterwards rebuilt chiefly of stone. It contains about 15,000 inhabitants. In the Upper Town, which is properly called the city, stands the fort, which was built with stone, by governor Gagarin. In the fort are the governor's court, as it is called, the governor's house, the archbishop's palace, the exchange, and two of the principal churches, which are all stone buildings. The Upper Town, which stands on the east side of the fort, and is inclosed within an earthen rampart, affords nothing remarkable, but a market for provisions and all kinds of small ware, three wooden churches, and a convent. The Lower Town contains a market-place for all kinds of provisions, on which several shops are built. The Upper Town is out of the reach of inundations from the river, by its high situation, which, however, is attended with this inconvenience, that the inhabitants are under a necessity of going down the hill for water. Besides, large mafes of earth fall from the side of a hill, on which the town stands, towards the river, and in a billy year, which obliges the inhabitants to pull down and rebuild the houses that stand near the declivity. The Lower Town, indeed, has water at hand, but is exposed to inundations when the river overflows its banks; but such floods do not happen every year. The town is very populous, and almost the fourth part of its inhabitants is composed of Tartars, who are partly seduced from those that were settled there before the conquest of Siberia, and partly from the Bucharians. These Tartars, in general, behave very quietly, and carry on some manufactures, but practice no mechanic trades. They are very sober, and averse from intemperance, and all kinds of riotous living. The rest of the inhabitants are Russian, whose ancestors were banished bither for their crimes, such as are exiles themselves. As everything is sold here to excessive cheap, that a common man may live very well at Tobolliks at ten rubles a year; indolence and sloth prevail to such a degree, that it is a hard matter to get the least utensil, &c. made, though the town abounds with artificers, who want neither tools nor materials to carry on their respective trades. The commerce is in a flourishing condition in this city; and the traffic which the Bucharian and Kalmuck merchants carry on in Indian goods, with which they supply all Siberia, and part of Russia, is very considerable. All the Chinese caravans are obliged to pass through this town; and all the furs furnished by Siberia are brought into a warehouse in this city, and from hence are forwarded to the Siberian chancery at Moscow. Several of the Swedish officers, who were taken prisoners at the battle of Pultawa, and sent to Tobolliks, set up schools here, in the year 1713, for teaching the children of Swedes, Russians, Cossacks, Tartars, &c. the German, Latin, and French languages, with geography, geometry, and drawing. Many of them also took in boarders. These schools acquired great reputation; so that children were sent hither for education, from a considerable distance, and the exemplary behaviour of these military pedagogues was attended with uncommon success. However, when the peace of Nyftadt was concluded, the Swedish officers returned into their own country, and then these beneficial seminaries of learning dropped of course. Some time after a German school was founded here, under the auspices of the emperors; 1000 miles E. of Moscow, N. lat. 57°. E. long. 68° 14'.

TOBOLSKIAN TARTARS, derive their appellation from the river Tobol, on which they dwell; and they are the descendants of the inhabitants of Iker or Sibir, their ancient capital, which being reduced to a heap of ruins after Yormak's conquest, they abandoned; and instead of it the Ruffians afterwards built Tobolliks. These are diftinguished from the Tartar inhabitants of Tobolliks, who are a barbarian colony. Their number amounts to upwards of 4000 males.

TOBOLSKOI, a government of Russia, extending from N. lat. 55° to 78°. E. long. 59° to 108°, including a considerable part of Siberia. Tobolliks is the capital.

TOBORON,
Tobor, a town of Thibet; 53 miles N. of Tourfan Hotun.

Toboso, El., a town of Spain, in New Castile; 37 miles S. of Hunte.

Tobrana, a town of the island of Cuba; 148 miles S.W. of Havannah.

Tobrus, in Ancient Geography, a town of Africa Propria, in the number of those situated between the river Bagadus and the town of Thilbruck. Potomency.

Tobulla, in Geography, a town of Africa, on the E. coast of Tunis; 8 miles N.W. of Meden.

Toby, a town of Sweden, in Esth Bothnia, near the Gulf; 20 miles N. of Christiandand.

Ton's Creek, a river of Pennsylvania, which runs into the Alleghany, N. lat. 41° 8'. W. long. 79° 40'.

Tocona, a central town of New Granada, E. of Bogota, the capital.

Tocaigh, a bay on the W. coast of the island of Owyhee: the depth of water was 25 fathoms; the bottom a stiff clay, and good holding ground, incommoded by a patch of rocky bottom, which was found to shoal suddenly, and the depth to decrease to 7, 4, and 3 fathoms, about the fourth of a mile to the south-west of the anchoring-place; and consequently to be a very great inconvenience to the roadstead, which at best, in the opinion of captain Vancouver, is but a very indifferent one, being entirely exposed to the north-west winds, and the western oceanic swell, which beats with great violence in the reefs that encompass the shores. These reefs stretch out a mile or upwards, leaving between them and the land a narrow channel, that affords comfortable and commodious landing for small boats and canoes; but the land is at too great a distance from the place of anchorage to allow of prosecuting any debarkation from the ship. N. lat. 20° 3'. E. long. 204° 4'.

Tocaima, a central town of New Granada, in the immediate proximity of Bogota, the capital, and W. of it; founded in 1544, at some distance from the river Poti, called Bogota, not far from its confluence with the river Magdalena. Its situation is bad, exposed to great heats, and numerous venomous creatures, and even deftitude of water. But the district is very fertile in cacao, tobacco, sugar, maize, yuccas, plantains, potatoes, &c. and the fish are abundant in the rivers of Bogota and Fugafagura, though there be many alligators. The inhabitants, about 700, are mostly poor. Here are mines of excellent copper, though not worked.

Tocantins River, a river of South America, formed by the union of a number of small rivers in Brazil, which rise about the 18th or 19th degrees of south latitude, and between the 50th and 51st degrees of west longitude. Its course is due north to the 2d degree of south latitude, when it joins the Guanapu, about 126 miles from the sea, and takes the name of Para, from a city so called.

ToCat, or Tokar, a city of Asiaic Turkey, in the pachalic of Sivas, anciently a city of Pontus, called Berisa. It is situated on the river Tofansu, in the corner of a valley, and almost surrounded with mountains, which afford quaries of marble, and well supplied with water from innumerable springs. On the top of a lofty rocky mountain, on the W. side of the town, are the remains of an old castle. The streets are well paved, but frequently built on uneven ground. The houses are tiled, and mostly built with wood. It is the residence of a caldi, a waiwode, and an aga, commanding a thousand janizaries, and some lapiis. The inhabitants are computed to be 60,000, consisting of 20,000 Turkish families, 4000 Armenians, and about 400 families of Greeks. The Armenians have seven churches, the Greeks only one. The Armenians make an excellent wine, resembling claret in flavour, but stronger. Fruits are abundant in this town, and the grape-vines are excellent. It is the seaport of a metropolitan, dependent on the archbishop of Nefiar, or Guonesare, an ancient city, almost ruined, about two days' journey from Tocat. Here are some manufactories of silk and yellow Turkey leather; but the chief trade is in copper vessels, kettles, candlesticks, &c., which are sent to Constantinople, Egypt, &c. Tucat may be considered as the centre of trade of Asia Minor. The copper is obtained from the mines of Gumicatana, at the distance of three days' journey from Trebifond, and from those of Caltan Boal, yet richer, and situated ten days' journey from Tocat, on the W., towards Angora. The caravans from Diarbek arrive in eighteen days, from Sinob in six, from Burfa in twenty, from Smyrna in twenty-seven, and proportionately less on horseback, or on mules; 40 miles N.W. of Sivas. N. lat. 39° 35'. E. long. 36° 30'.

Toayo. See Toceu.

Tocata, Ital. from tocarr, to touch: to prelude, to touch an instrument, to play a short movement extempore, previous to the performance of a regular piece.

Tocatina, a short prelude, or trial of an instrument.

Toccavienisis Bolus, Boile of Tobay, in the Materia Medica, a fine medicinal earth, dug about Tobay in Transylvania, and esteemed a powerful astringent. Kent-man calls it the bolus Panonica vera; and Crato, bolus Hungarica.

This last author esteemed it superior even to the bole armeniaci of Galen, and had a great opinion of it in malignant fevers. It is a fine and pure earth, and very heavy, moderately compact in its texture, but not very hard; and in colour of a considerably deep and strong yellow. It is naturally of a smooth surface, and does not stain the fingers in handling. It ferments violently with acid menstrua, and does not become red in burning. Hill. See Bol.

Tochen, in Geography, a town of Germany, in the principality of Anhalt Zerbit; 5 miles W. of Zerbit.

Tochu, a town of Africa, in the kingdom of Quoja.

Tocay, in Zoology, the name of a species of Indian lizard, differing in the other kinds, by being spotted all over.

Tocksdorf, in Geography, a town of Prussia, in the province of Bartenland; 6 miles N.W. of Raistenburg.

Tocmia, in Ancient Geography, a town of Arcadia, in the southern part to the N.W. of Megalopolis, and E. of the Alpheus. It stood upon an eminence; but it was in ruins in the time of Paulanias.

Tocmol, in Natural History, a name given by force to the common turtle.


Tocolosida, in Ancient Geography, a town of Africa, in Mauritania Tingitana. Potomency. The Itinerary marks it 48 miles from Tingis, and three miles from Volubils.

Tocorary, or Tukorari, in Geography, a town of Africa, in the country of Ante; 10 miles E. of Infusa.

Tocort. See Teggurt.

Tocosanna, in Ancient Geography, a river of India, on the other side of the Ganges. Potomency places its mouth in the Ganges.

Tocoyena, in Botany, an unexplained name.—Aubl. Guian. 131. t. 50. Jull. 201. Lamatre Illustr. t. 163. 5 E See
TODC

See *Gardinia*, of which this is probably a species. The author calls his only species *T. longiflora*, and his description contains the following particulars.

The stem is three feet high, erect, simple, leafy, scarcely thrubby. Leaves opposite, erect, plant, fifteen inches long, lanceolate, entire, smooth, tapering at each end, on smooth footstalks, about an inch and half in length, attached to a pair of triangular, acute, combined, infrafoliaceous *petals*. Flowers about fourteen in a terminal head, in opposite sepal like pairs, each flower accompanied by two small scale *bracteae*. **Calyx** superior, bell-shaped, in five small segments, measuring with the *gernen* not more than four lines. **Corolla** with a yellowish cylindrical tube, as thick as a goose-quill, and nine or ten inches long, dilated at the throat, and terminating in a white bell-shaped limb, with five ovate, equal, spreading segments. **Anthers** nearly sepal like, between the segments of the corolla, oblong, incumbent. **Gernen** oval, inferior. **Style** capillary, the length of the tube, twisted and hairy for an inch below the top. **Stigma** of two large, compressed, oval lips, included within the throat of the corolla. **Beryl** oval, an inch long, crowned with the calyx, of two cells, with numerous roundish seeds, imbedded in viscous pulpy. The flowers have a very sweet smell. A bulb met with several plants of this species in the wood of Aroura in Guiana, flowering in Aug.-All the leaves were perforated or gnawed by insects. His dried specimen of the flower is as black as ink. If *mannia* of Thunberg and Salibury be distinct from *Gardinia*, the present plant should seem to belong to the former.

**TOCRUM**, in Geography, a town of Bengal; 8 miles S. of Koonda.

**TOCRUR**, a town of Africa, and capital of a kingdom, in Nigria, on the north side of the Niger, W. of Calhna; 270 miles E.N.E. of Tombuctoo. N. lat. 16° 32' E. long. 6° 5'.

**TOCSON HOTUX**, a town of Tiibet; 20 miles W.S.W. of Toufan. N. lat. 43° 26'. E. long. 80° 14'.

**TOCUYO**, a city of South America, in the government of Venezuela, situated in a valley formed by two mountains. Its division and construction are very regular: the streets are on a line, and sufficiently wide. It has a well-built parish church, on which depends a chapel of ease. The Franciscans have one monastery, and the Dominicans another. It is governed by a common-council. The climate is rather cold than hot; and though the sky is often overcast, the air is wholesome. The inhabitants are graziers, agriculturists, artificers, and traders. The wheat of its vicinity is reckoned the best in the province, and furnishes sufficient for the consumption of many towns of the interior. They export from 8000 to 10,000 quintals of flour. From the wool of their sheep they fabricate coverlids, and other cloths, which they carry as far as Maracaibo and Carthagena. They have also tanneries and taweries, and, like the inhabitants of Carora, work up as many as they can of the raw materials, and sell the best. Another article of commerce, very lucrative to the citizens of Tocuo, is salt, which they bring from the salt-ponds of Coro. In this city are reckoned 10,000 persons, who are reproached with the crime of suicide. Tocuyo is 90 leagues distant S.W. of Caracas, and 20 leagues N. of Truxillo. N. lat. 9° 35'. Long. W. of Paris 72° 40'.—Alfo, a river of Venezuela, which discharges itself into the sea, 25 leagues E. of the Gaigues, which runs 16 leagues W. of Coro. The source of Tocuyo is about 15 leagues S. of Carora, upwards of 60 leagues from the sea. It is navigable as far as Banagua, a village situated on its banks, at the distance of 40 leagues from its mouth. Its vicinity furnishes abundance of timber of the largest size, and fit for every kind of building. Depons, vol. i. and ii.

**TOD** of wool is mentioned in the statute 12 Car. II. c. 32. as a weight containing twenty-eight pounds, or two flane. See Weight.

Some will have the word derived from the French, *toile*, a wrapper, within which, by usage, two flanes of wool are folded.

A laft of wool contains 12 facks, a fack 2 weights, 13 todes, 26 flane, 52 cloves, or 354 pounds.

**Tod-Head**, in Geography, a cape on the east coast of Scotland, in the county of Kincardine; 15 miles S. of Stonehaven. N. lat. 56° 51'. W. long. 20° 11'.

**TODDALLA**, in Botany, Juff. 371. Poiert in Lam. Dict. v. 7. 693, a barbarous name made out of the Kaka-todall of Rieceed, Hort mal. v. 5. 81. t. 41. (See Scopolia.)—Toda, with some addition, is the appellation of other Indian plants, as *Todda-pana* of *Cyica cinerinus*, and *Todda-vaddi* of *Oxalis senfiflua*. We humbly hope that the worthy M. Poiret, who is so highly displeased at our wishing to retain a Scopolia, will approve of our having so much laboured to establish a Pomedd. See that article.

**TODDA-PANA**, the name by which many authors call the *palmia farinifera*, or lago-tree.

**TODDINGTON**, or Tuddington, in Geography, an ancient market-town in the hundred of Manhead, and county of Bedford, England; is situated five miles N. by W. from Dunstable, and 39 miles N.W. by N. from London. A market was originally held here on Thursdays, by a grant from king Henry III. in 1218; but this was changed to Saturday, by a charter of Edward II. in 1316, which was confirmed by Richard II. in 1385. In 1881, the market was so considerable, that sixteen butchers rented stalls in the market-place. It gradually declined, and of late years has been wholly discontinued. The market-house was pulled down in 1799, and the materials sold. It is probable, that it had been before discontinued, and afterwards revived, as Leland does not include Toddington in the list of the market-towns in Bedfordshire. A fair was granted by the charters of 1218 and 1316; five are now held in the year. The population return of the year 1811, states the parish to contain 259 houses, and 1143 inhabitants. The manor of Toddington was given by William the Conqueror to Ernulfus de Hedifin, ancestor of the earls of Perch. On the death of the last earl, in 1618, it devolved to the earl of Pembroke, and from him to Paulinus Peyvre, steward of the household to Henry III. From the Peyvre family, the manor defended to Sir Thomas Cheaney, K. G., whose son, Henry, was knighted by queen Elizabeth in 1658, the being then on a visit to him at Toddington. In 1572, the created him lord Cheaney. Lord Cheaney built a noble manor at Toddington, of which nothing now remains but the kitchen, which is remarkably spacious. Toddington church is a handsome structure; the frieze, on the outside, is decorated with grotesque figures of animals. The south transept contains some ancient monuments of the Peyvres, and also those of the Cheaneys. The north transept was the burial-place of the Wentworths, and contains two monuments to lady Maria, and lady Henrietta Wentworth, on each of which 2000l. were expended. Both transepts are in a shameful state of dilapidation. In the year 1443, an hospital was founded at Toddington, by Sir John Broughton, for three poor men, and a master or chaplain, who was to pray for the souls of the Peyvre family. There are now no traces of the hospital: the stones were used in building the market-house. Lyfons's *Magna Britannia*, vol. i. Bedfordshire, 1806.
TODDIPOODY, a town of Hindooftan, in the circuit of Rajamundry; 18 miles E.S.E. of Rajamundry.

TODDI, or TOD, is a juice drawn from various kinds of palms, by cutting off the branch intended by nature to produce fruit, and receiving from the wounded branch the sap which was designed for the nourishment of the future crop. But as toddy, although sweetish when first drawn, is in a state of fermentation in the course of 24 hours, acquiring an intoxicating quality, and thus becomes four and harish, it could not have been the palm-wine of the ancients; which must have kept for some time, as it was carried on the rivers during voyages of many days, and even appears to have been stored up. Todd is used with molasses, rice, and other ingredients, in the distillation of Arrack; which fee. The toddy of the date-tree is said to be of an inferior quality to that from some other kinds of palms. The palm-wine was made in Babylonia, where palms abounded, of the fruit of the palm-tree. This was sweet to the taste, but apt to give the head-ache. The palm, as Herodotus informs us (Clio, c. 193.) produced to the inhabitants of Babylonia, bread, wine, and honey. The wine must have been very plentiful, for he says that the boats which defended the Tigris from Armenia, some of which were very large, were loaded with palm-wine as the principal article of their commerce. We derive similar information from Xenophon, who speaks of the floats that passed the Ephrates at Carmanada, and the Tigris at Cene. We learn, from the travels of M. Burckhardt in Nubia (Nubia) in 1813, that the practice of making wine as an article of commerce is discontinued in Mesopotamia and Babylonia, where the date-trees abounded, and where the profusion of fruit rendered wine so plentiful, because in modern times the want of a proper distribution of water for irrigation, has left only a small proportion of date-trees; and hence it is probable, that none of the fruit can be spared from the necessary demand for food. Kempter is silent on the subject of palm-wine; and this circumstance satisfactorily proves the discontinuance of the practice of making it in those countries. M. Burckhardt tells us, that in all the larger villages of Nubia, the use of palm-wine is very common; and at Derr, the reputed capital of the country, a great quantity of spirit is consumed. The wine, he says, does not taste amifs; but it is too rich and too thick to be drank with pleasure. When the date-fruit has acquired its full maturity, it is thrown into large earthen boilers, and left to boil without interruption for two or three days. It is then strained, and the clear juice put into earthen jars, well closed and buried in the ground, where it ferments. It lies ten or twelve days under ground; at the expiration of which time it is fit to drink. It keeps for twelve months, and then turns sour. The aqua-vite made from dates is of a very good quality, and keeps well for years. People of the upper classes at Derr are every evening intoxicated either with date-wine or spirits, of which great quantities are consumed. They are fond openly. From Stout, southward, through Upper Egypt, date-spirits are made and publicly sold; the pacha receiving a tax upon it from the inn-keepers: they also make a kind of jelly or honey from the dates, which serves for a sweet-meat.

TODDY-Tree. See MAMMEE-Tree.

TODEA, in Botany, a supposed genus of ferns, dedicated by Wildenow to the memory of the Rev. Henry Julius Tode, a clergyman of Mecklenburg, who died in 1797, aged 64. He is distinguished among cryptogamic botanists, as the author of an accurate and practical work, in quarto, with numerous plates, entitled Fungi Mecklenburgensis Slechii, published at Lunenberg, in 1790, to which the reader will find frequent references in our several articles relating to the order of Fungi. This genus, however, is sunk in OsMunda; see that article, n. 3.

TODENDORP, in Geography, a town of the duchy of Holstein; 6 miles N.E. of Hamburg.

TODI, Maria Francisca, in Biography, born in Portugal in 1748, arrived in England in 1777, with Jermoli, as first woman in the comic opera. She must have improved extremely after she left this country, where she remained only one season, and was little noticed; her voice being feeble, and seldom perfectly in tune. But the afterwards became the most captivating singer for taste and expression in cantabile airs, in France and Germany (according to report), that ever appeared in Europe. She was taught by Perez.

TODI, in Geography, a town of the Popedom, in the duchy of Spoleto, near the Tiber, the see of a bishop, immediately under the pope. It contains several churches and convents; 18 miles W. of Spoleto. N. lat. 42° 47'. E. long. 13° 18'.

TODIALOOR, a town of Hindooftan, in the country of Coimbetore; 5 miles N. of Coimbetore.

TODIVESTI, a town of Moldavia; 6 miles N.E. of Soccava.

TODOROVA, a town of Croatia; 18 miles W.N.W. of Novi.

TODOS SANTOS. See All-Saints.

TODS, a town of the slate of Virginia; 9 miles E.N.E. of Hanover.

TODTENVOGEL, in Ornithology, a name by which Gefner and some other authors have called that species of guanche, known in England by the name of the stone-chatter, flour-finch, or moor-sitting.

TODTIBERG, in Geography, a mountain of Switzerland, and reckoned one of the highest in the country, in the road from Difentis to the Griffins.

TODUCÆ, in Ancient Geography, a people of Africa, in Mauritania Cefariensis, towards the source of the river Amphiagia.

TODUS, TODY, in Ornithology, a genus of the order Picc, the characters of which are, that the bill is awl-shaped, somewhat deflated, obtuse, straight, and at its base beft with bristles; the nostrils are ovate and small; the feet are formed for walking; and the outer toe is connected at the base to the middle one.

Species.

VIRIDIS. Green, with a red breast: the green tody. Found in the warmer parts of America, and the neighbouring islands.

CINEREUS. Ash-coloured, with the under part yellow: the Tis-tie of Buffon; the grey and yellow fly-catcher of Edwards. Found in open places of Surinam and Guiana.

Fuscus. Ferruginous, under part olive-coloured, spotted with white; the tail ferruginous, and wings crossed with blackish bar. Found in South America, less than the green.

CARULEUS. Blue, with white throat; temples, throat, and abdomen orange. Found in America, of the size of the green.

VARIES. Varied with blue, black and green; the bill, head, throat, neck, feet, nails, and tail black; the margin of the tail, and the coverts of the wings green. Found in India.

LEUCOCEPHALUS. Black, the head subcrinated; throat and upper part of the neck white: white-headed tody of Latham. Found in America.
TOE

BRACHYURUS. Black, the vertex, neck, back, and short tail black: the short-tailed toady of Latham. Found in America.

PLATYRHYNCHUS. Above lead-coloured hoary, beneath milky; the crown, wing-feathers, and tail black: plumbeous toady of Latham. Found in Surinam.

OSCELOTUS. Above brown and black, underneath very fardil white, with pale throat: the bulky toady of Pentant and Latham. Found in Rhode island.

REGUS. Black and brown; the breast white, fibrated transfusely with blackish; the throat and eye-brows white; the abdomen, rump, and tail red; the crest ferruginous at the apex, tipped with black: king toady of Latham. Found in Cayenne.

PARADISEUS. Crested head black; body white; tail wedge-formed; the intermediate tail-feathers very long; pied bird of paradise of Edwards, and paradise fly-catcher of Latham. It has the following varieties; viz. the tody with wings and tail pale-red; the toody underneath white, the breast from cerulean to cinnamon; and the Brazilian crested tody. Found in Africa and the island of Madagascar.

FERRIGNUS. Ferrugineous-black, underneath ferruginous; wing-feathers marked with a brown bar; cheeks spotted with black and white: the ferruginous-bellied toady of Latham. Found in Cayenne.

NOVES, or GILLARIS. Brown, underneath white; throat white, and breast spotted with brown, above yellow: white-chinned toady of Latham.

PLATYRHYNCHUS, or ROSTRATUS. Brown-yellowish, beneath yellow, throat whitish; vertex lead-coloured, with a white spot upon it; wings and tail brown; bill very broad: the broad-billed toady of Latham.

MACROHYNCHUS, or NASUTUS. Black, bill very broad; skin, sides of the cheeks, abdomen, vent and rump red: the great-billed toady of Latham.

RUBUDULA. Cinnamon, with orange throat and breast, and white abdomen: the red-breasted toady of Latham. Native of New Holland.

XANTHOGASTER, or FLAVIGASTER. Brown-cinnamon, fix inches long; beneath interosseus, with pale bill: the yellowbellied toady of Latham. Native of New Holland.

CRISTATUS. Crest crimson; body brown, spotted with white. Found in Guinea.

TOEBAN, in Geography, a town on the N. coast of the island of Java.

TOELCHUS de APIS, a district of South America, in the country of Patagonia.

TOELCHUS de la Galabola, a district of South America, in the country of Patagonia.

TOE-LING HOTN, a town of Chineese Tartary; 375 miles E.N.E. of Peking. N. lat. 42° 22'. E. long. 123° 20'.

TOE-ENTE, in Commerce, a corn measure in Denmark, equal to 8 schefeils or skiepers, or 32 fotheits or forlings, and 12 toeends = a laf: 100 toeends of Copenhagen, answer to about 49½ English quarters. A laf of Spanish fats, or of colots, contains 18 toeends, and the toende 8 skiepers or 176 pots, which contain 5½ Danish cubic feet; but Norway laf is fold by weight, and the toende muff weigh 250 lbs. Danish weight, or 275 lbs. avoirdupois. A laf of French fats, or of lime, contains 12 toeends, corn measure; a laf of oil, butter, and other fat substances, is 12 toeends, beer measure; and a toende of beer must hold 4½ Danish cubic feet, or 116 pots. By a toe or toende of hard corn is meant as much land as can be tilled with 1 toeend of rye, 1 of barley, and 2 of oats. What is called a toeend of fastland or arable land is the fourth part of the above, and contains 56½ Danish square rothes, or 220 English square perches. Thus the toende of hard corn is = 5½ English acres. A Danish square foot contains about 153 English square inches; or 16 Danish square feet = 17 English square feet nearly.

TOENNI, in Ancient Geography, a people of Germany, in the vicinity of a lake, which was common to them, the Rhzitians, and Vindelicians. Ptol.

TOENIOLOKER, in Geography, a small island in the East Inland sea. S. lat. 5° 30'. E. long. 132° 32'.

TOES, by anatomists called digitis pedis, are the extreme divisions of the feet, answering to the fingers of the hand, and resembling them in figure, and make the third part of the foot. See Extremities.

TOES, Adhesions of the. It is a frequent thing to meet with new-born infants with their fingers or toes cohering or growing together, either by a strict adhesion of the flesh, or else by some loose productions of the skin, as in the feet of ducks and geese; and a disorder of the same kind is also sometimes found in adults, from accidents; as when the fingers or toes have been neglected, after an excoriation of them by burns or wounds. In both these cases the surgeon's assistance is necessary, partly to remove the deformity, and partly to restore the proper use of the fingers.

These adhesions, according to the nature of the disorder, are to be separated by cutting out the intermediate skin, or else barely by dividing them from each other with a pair of scissors. When this is done, to prevent their coheisons again, each finger must be invected separately with a spiral bandage about an inch broad, dipped in lime-water and spirit of wine.

Sometimes the fingers, instead of adhering to each other, grow to the palm of the hand, from wounds or burns, so that they cannot be by any means extended, or drawn back to open the hand. The method of relieving this disorder is first very carefully to separate the fingers from the adhesions of the palm, without injuring their tendons, then drees them with a vulnerary balm, and seareed hilt, and extend them on a ferula or thick palfie-board; and let them remain in this extended posture, separately to be dressed till they are perfectly healed; but at every dressing they must be gently moved, to prevent a rigidity or stiffness of the joints. Heiliter.

TOE, in the Manege, is the lay of the hoof upon the forepart of the foot comprehended between the quarters.

We commonly say the toe before, and the heel behind, in French pince devant et talon derriere; implying, that in horse, the toe of the fore-feet is stronger than the toe of the hind-feet: and, on the other hand, that the heels behind are stronger than those before; and accordingly, in shoeing we drive highest in the toes of the fore-feet, and in the heels of the hind-feet.

A horse that does not rest his hind-feet all equally upon the shoe, but raises his heels, and goes upon the toes of his hind-feet, is called in French rampin.

TOE-HEAD, in Geography, a cape of the county of Cork, Ireland, not far from the Stags of Castlehaven. N. lat. 51° 27'. W. long. 9° 0'.—Also, a cape of Scotland, on the S.W. coast of the island of Lewis, in that part called Harris; 42 miles S.W. of Stornaway. N. lat. 57° 50'. W. long. 7° 5'.

TOE-SHELL, in Conchology. See Pollicipes.

TOE-STICK, in Agriculture, the flack or bar which confines that part of small carts in its place, that contains the load, but which, on being flapped out, lets that or a part of it be discharged. It has been observed in the Corrected Agricultural Report of the County of Norfolk, that Mr. Overman,
TOF

Overman, of Burnham, in that district, has made an improvement in his cart of this kind: instead of the toelick drawing out to let the back or framed part of the cart fold up, and deliver the load or part of it, this contrivance turns in the centre on a pivot, and the hooks which confine it at the ends, are each in a position the reverse of the other, by means of which it is expeditiously effected.

TOESA, in Commerce, a long measure in Spain; the toela or braza is 2 varas, or 6 feet, that is, 66½ English inches; a pavo or pace, is 5 feet; an estadal, 12 feet, or 4 varas; and a cuerda, 8½ varas.

TOESCHI, ALESSANDRO, in Biography, the head of a celebrated musical family from Romaniia, settled at Munich, who in 1750 was appointed concert-maître to the elector of Bavaria’s ecclesiastical band.

TOESCHI, CHARLES JOSPEH, after being director of the chamber-music of the court of Bavaria, in 1756 was appointed first violin in the famous band of the elector palatine at Mannheim. He was five years concert-maître, and engaged in other honourable professional employments about the court of Mannheim till 1786. In 1766 he published at Paris six symphonies; violin quartets; and flute concertos. About the same time, six violin duets, and other works at Amsterdam. His style is full of fire, new effects, and in flow movements, grace and elegance. He was a disciple of the great Stamitz, and died at Mannheim in 1788, in the 60th year of his age, leaving behind him an excellent private character.

TOESCHI, JOHN, concert-maître at Mannheim, and an admirable performer on the violin. He was one of the principal ornaments of the famous court-band in 1756.

TOESCHI, SUSANNAH, a finger of great merit in the service of the court at Munich, brought up under Holtzbauer, the maestro di capella to the elector palatine.

TOESOBUS, in Ancient Geography, a river of the isle of Alphon, which had its mouth, according to Ptolemy, on the western coast, between the gulf Serica and the promontory Ganganorum: probably the river Conway.

TOE-YAH-YAH, in Geography, a bay of Owyhee, one of the Sandwich islands, extending along the whole coast from the westernmost point, to the northern extremity of the island, and bounded to the N. by two very conspicuous hills.

Towards the bottom of the bay there is foul, corally ground, extending upward of a mile from the shore, without which the foundings are regular, with good anchorage, in twenty fathoms. Cook’s Third Voyage, vol. iii.


Gen. Ch. Col. Perianth inferior, of one leaf, membranous, three-eleft, small, persistent. Cor. Petals six, oblong, concave, equal, spreading, permanent, many times longer than the calyx. Stam. Filaments six, opposite to the petals, awl-shaped, simple, smooth, about the length of the corolla; anthers incumbent, roundish-heart-shaped. Fil. Germens three, superior, converging, pointed, terminating in as many short, dilated, vertical styles; stigmas capitate. Peric. Capsules three, connected at the base, gibbous, keeled, membranous, of one cell and two valves, burting chiefly at the inner edge. Seeds numerous, elliptic-oblong, angular, inserted into the inner margin of each valve.


The small membranous permanent calyx, more or less distantly separated from the other parts of the flower by an elongation of the base of the latter, is the very peculiar character of *Tofieldia*. By this it is distinguished from *Helonia*, *Narthecium* and *Anthericum*, with all which it has been confounded; see those articles. *Helonia* moreover has a simple germin and capsule, with very few seeds. *Narthecium* and *Anthericum* have each a simple style; the former hairy filaments, and tunicated seeds; the latter angular seeds.

Five of the six species, now known to compose the genus before us, have been confounded together as one. We shall give their characters, and most essential synonyms.

The whole history of the millakes which have embodied the synonyms and characters, both generic and specific, of *Tofieldia*, have lately been detailed, more at length than suits our purpose here, in a paper communicated to the Linnean Society by the writer of the present article.

The species are all perennial and herbaceous, with simple stems, spikel, or generally cluttered, flowers, sword-shaped, equitant, mostly radical, leaves, the habit of the whole very nearly according with *Narthecium*. The seeds, in some instances, betray an affinity to that genus, in a little membranous appendage at each extremity, as may be seen in our *T. alpina*.

1. *T. palustris*. Scottish Alpodel, or Marth Tofieldia. Huds. n. 1. Pl. Brit. n. 1. Ait. n. 1. Eng. Bot. t. 536. (T. puilla; Purh. n. 1. Anthericum calyculatum; Linn. Sp. Pl. 447). Pl. Lapp. ed. 2. 166 t. 15. f. 3. Pl. Dan. t. 56. Lightf. Scot. 181. t. 8. f. 2. Helonias borealis; Wildl. Sp. Pl. v. 2. 274.)—Head of flowers ovate. Stem smooth, thread-shaped, leafles. Petals obovate, obtuse Germens roundish.—Native of bogs, and the margins of rivulets, on the mountains of Lapland, Scotland, Denmark, and North America, flowering about July. A little smooth plant, of a deep green, with a slender solitary stem, from four to six inches high, naked, except an occasional small leaf at the base. The radical leaves are two inches long, ereft, forming several tufts. Flowers small, pale green, in a solitary ovate-oblong denfe head, scarcely more than half an inch in length, often much less. There are hardly any defirenable bractes, the calyx being cloae to the main stalk, and divided down to the base, into three small, acute, membranous segments. The ret of the flower is elevated on a short stalk within the calyx, which, as the fruit advances, becomes very conspicuous. The calyptra are obovate, each about the size of a mustard-seed, crowded together into a globular form, minutely pointed, and crowned by the filaments.

Michaux and Purh, mistaking what we shall next describe, for the true Linnean *Anthericum calyculatum*, wholly confidered this as a new species. A little examination, of the *Flora Lapponica* in particular, would have prevented this error, though all writers upon European plants have hither-to confounded the two species in question.

TOFIELDIA.

v. 2. 165. Point in Lamarck Dict. v. 4. 431, the synonym confused. Phalangium alpinum palustre, iridis folio; 
Tourn. Infl. 368. Segu. Veron. v. 2. 61. t. 14, copied in 
Lamarck's t. 266. Pseudo-aphelodium fecundus; Chuf. Hift. v. 1. 198. Aphelodium Lascaltrix verus; Ger. Em. 95.)
—Clutjer cylindrical. Bracteas nearly equal in length to the flower-flasks. Stem smooth, bearing two leaves. Petals obovate. Germans oblong.—Very common in moist, gravelly, 
habitats, on the Alps of Austria, Switzerland, Italy, Savoy, and Dauphiny, flowering in August. We know not of its having ever been observed in Britain, notwithstanding the name in Gerarde's herbal, which is misapplied to the figure of this plant, and properly belongs to Narthecium offffragmum, exhibited in the preceding 
page of the same book. Linnaeus knew the present species 
by its synonyms only, cited, with marks of well-founded 
doubt, in his Fl. Lapp. He was led by Dillenius to esteem 
it a mere variety of the foregoing, an opinion generally 
adopted ever since, but certainly for want of due enquiry. 
The alpina is not only twice the size of palaefris, with 
a thicker more woody root, but the flen always bears two 
distant leaves. The flowers form a clufier, not a head or 
spike, from one to two inches long, often interrupted, with 
a concave bractea at the base of cach flusk, about its own 
length. Calyx close to the rest of the flower, rather slightly 
three-cleft. Petals more yellowish. Capiffules oblong, 
combined almost all the way up, thrice as large as in palaefris. 
As the fruit advances, the partial flisks become still more 
evident than in the flower.

3. T. flenopetala. Narrow-petalled Tofieldia. Sm. MSS.
—Clufier, cylindrical. Bracteas overtopping the calyx. 
Stem smooth, bearing two leaves. Petals lanceolate, acute. 
Native of North America, where it was gathered by 
Kalm, whose specimens were referred by Linnaeus to his 
Aanthéricium alpina. They more agree with our T. alpina, 
in size and habit, having two or three leaves on the flusk. 
The clufier is dense and obtuse, an inch and a half long. 
Bracteas very different from that species, being 
lanceolate, and always as long as the partial flusk and calyx 
taken together; sometimes much longer. Calyx broad and 
shallow, unequally notched. Petals greenish-white, lanceo- 
late, narrow and acute, not obovate. Anthers pointed. 
Germens tapering into stiles twice the length of the fore- 
goin. No doubt can exist of this being a most distinct 
species. We find no indications of it in the works of 
Micha us or Pursé, nor is its precise place of growth known.

4. T. cermus. Drooping-flowered Tofieldia. Sm. MSS. 
(Aanthéricium n. 39; Linn. Sib. v. 1. 73. t. 18. f. 2.)
—Clufier cylindrical. Flowers drooping. Bracteas very 
short. Flower-flisks smooth, the length of the corolla. 
Stem leaves.—Found by Gmelin in mountainous woods in 
Siberia, flowering late in July. This is a species so 
evidently distinct from all the foregoing, that we cannot ac- 
count for their having been confounded; except by sup- 
pofing that Linnaeus, not having specimens of cach in fruit 
as well as in flower, too hastily considered the various 
appearances before him, as caused by different stages of 
growth. The drooping flowers, and quite pendulous fruit, 
of the present plant are remarkable at first sight; and the 
former are expressed in Gmelin's figure. These characters 
are too decided, in both our specimens, to be attributed to 
any accident in drying. The whole plant indeed is larger 
than any of the former three, with more creeping roots. 
Stem a foot high, or more, quite leafless, except at the very 
bottom, glaucous in the upper part. Leaves near three 
iches long, narrow, with a small oblique point, such as 
may be seen in some of the leaves of most of the species, 
except flenopetala, whose foliage is peculiar for its long 
strait, taper points. Clufier erect, smooth, two inches 
long while in flower, near four when in seed, rather lax, 
many-flowered, fiercely interrupted. Flower-flisks spreading, 
slender, scattered, about an eighth of an inch long, 
and still longer when the fruit is fully grown, having a little 
ovate bractea at the base of each, about a quarter the length 
of the flusk. Flowers white, about twice the size of Con- 
valiaria bifolia. Calyx with three hollow lobes. Petals 
oboovate, obtuse, slightly pointed, concave, the length of 
the flower-flisks, and keeping pace with them in their sub- 
frequent elongation. Staminus shorter than the corolla, with 
yellow, heart-shaped, pointless anthers. Germans ovo- 
lanceolate, with longish stiles. Capiflules shorter than the 
permanent corolla, obovate, membranous, but brittle, 
combined nearly all the way up, so as to form a turbinate three- 
lobed fruit, crowned with the three spreading stiles and 
capitate figmas. Seeds minute, prismatic.—Gmelin's sup- 
pofed variety, taken from Steiler, having a leafy stem, is 
probably another species. T. cermus is a very pretty plant, 
and we may hope that, in some of the frequent importations 
from Siberia, it may be introduced into the gardens of 
England.

in Ait. Hort. Kew. n. 2. (T. pubescens; Purbe n. 2. 
Narthecium pubens; Michaux Bor.-Amer. v. 1. 209. 
Anthericum filamentosum; var. glaucous; Linn. Hort. 
abius; Pluk. Mant. 29. Phys. t. 342. f. 3.)—Clufier, 
cylindrical, interrupted. Flower-flisks aggregate, rough, 
the length of the corolla.—Found in the moif meadows, 
and moity boggy woods, of Virginia and Carolina, flowering 
in July, according to Clayton and Purby. This is most like 
the last in stature and habit, but the roughness of the 
flower-flisks and their main flusk, essentially distinguishes it. 
The former grow three or four together, as if rather whorled 
than scattered. The flowers are white, with yellow anthers, 
and appear to be always erect.

(Narthecium glutinosum; Michaux Bor.-Amer. v. 1. 210.)
—Clufier ovate, dense. Flower-flisks glutinous, rough, 
the length of the corolla. Anthers prominent, orbicular. 
—Gathered by Mr. Menzies on the west coast of North 
America. Micha us lays his plant is found from Quebec 
10lake Misaffins. There is no room to suppose the latter 
different from our's, though the Narthecium glutinosum of 
Mr. Gawler, Curt. Mag. t. 1505, is very decidedly so, being 
a real and evident Narthecium, not, like Micha us'a, a Tof- 
fieldia. Purbe calls it N. americana, p. 227, which name, 
though not one of the best, we would substitute for glutin- 
iformum in our article Narthecium, the plant not being glu- 
tinous. All reference to Micha us and his observations in 
that place are to be erased. The plant is, according to 
Purbe, a native of boggy fields and woods, on the pine- 
barrens, as they are termed, of New Jersey, flowering in 
June and July.

Our Tofieldia glutinosfa has a tuberous horizontal root, 
with long simple fibres. Stem a foot high, angular, roughish 
all over with short glandular hairs, especially for two inches 
from the summit. Leaves few, almost entirely radical, four 
or five inches long, narrow, ribbed, smooth, except a little 
roughness towards the point. Clufier about an inch in 
length, of twelve or fourteen pale-yellow flowers, on hairy 
viscid flisks, about a quarter of an inch long, sometimes in 
pairs, having at the base one or two acute bracteas, one- 
third that length. Lobes of the calyx shallow. Petals 
obovate, rather shorter than the flanus. Anthers purplish, 
nealy
TOFT, in Geography, a town in Sweden, in the government of Abo, on an island; 20 miles W.N.W. of Abo.

TOFT, Toftum, or Tofia, in our Law-Books, a parcel of land, or a place where a messuage hath rufid, but is decayed, or casually burnt, and not re-edified.

Toft also signifies a grove of trees.

TOFTA, in Geography, a small island in the Baltic, E. of the island of Aland. N. lat. 60° 13'. E. long. 20° 7'.

TOFTS, Katharine, in Biography, an English finger of great renown on our stage at the beginning of the last century. In 1703, the fng was at a subscription concert in Lincoln's-Inn theatre, several Italian and English fongs. This lady was the conflant rival of Margarita de l'Epine.

In 1703, the fng at the subscription music in Drury-lane playhouse; and soon after, fgnora Margarita fng for the firft time at the fame theatre. At her fcond appearance, there was a difburfeme while the fng was finging, which, from the natural, and, it is to be feared, not uncommon effects of rival malice, was fuppolled to have been created by the emi-

tories of Mrs. Tofts; an idea the more difficult to eradicate, as the principal agent had happened to live with that lady as a fervant. But as the law of retaliation is frequently prac-
tified on the like occasions by the injured party, it was thought necelfary, a few days after, to infert a paragraph and letter in the Daily Courant, February 8, 1704, in vindica-
tion of Mrs. Tofts.

She was the principal fng in Clayton's Arifines, in 1705, the firft opera attempted in our country and language on the Italian model. See CLAYTON.

Mrs. Tofts was likewise the heroine of the famous opera of Camilla, of Addifon's Rosamond, fet by Clayton, and Thomyris, adjusted to Italian music, and wholly to English words, till the arrival of Valentin, in 1707, the firft male soprano fng that ever appeared on our stage; when Ca-
milla and Thomyris were performed, half in English and half in Italian. And even after the arrival of the celebrated Nicolini, when a new opera, entitled Pyrrhus and Deme-
tius, was brought on the stage in 1708, in which almost all the characters were filled up by Italians, Mrs. Tofts con-
tinued to perform her part in English, as did Ramond and Cook; but the public seemed perfectly satisfied with the motley performance, which had a run of eighteen nights; and the confusion of tongues, concerning which Mr. Add-
ifon is fo pleafant in the Spectator, seems to have been tol-
terated with perfect good humour by the public, which, in music as well as words, seemed to care much less about what was fung, than how it was fung.

After the year 1709, when the whole opera, poetry, mu-
cical composition and performers were Italian, Mrs. Tofts, who seems to have endeared herself to an English audience by her voice, figure, and performance, more than any pre-
ceding fng of our country, retired.

Colley Cibber, though he does not fpeak of music en connoiffeur, and, as an English actor and primate of a theatre, was an enemy to Italian opera and Italian fingers upon a principle of self-defence, probably gives us the gene-
ral and genuine opinion of his acquaintance concerning Mrs. Tofts, who, he fays, had her fbrt musical inftructions in her own country; "before the Italian taste had fo highly prevailed, and was then not an adept: whatever defect the fhanfonably skillful might find in her manner, she had, in the general fene of her hearers, charms that few of the most learned fingers ever arrive at. The beauty of her fine pro-
portioned figure, and exquisitely sweet voice, with peculiar rapid fwiifncens of her throat, were perfections not to be imitated by art or labour." This performer had fongs given to her in all fyles; her compafs, however, did not surpass the common limits of a foprano, or treble voice. With regard to her execution, of which we are still enabled to judge by the printed copies of her fongs, it chiefly confifted in fuch paffages as are com-
prifed in the fake, as indeed did that of most other fingers at this time.

Mrs. Tofts quitted the stage in 1709. The talents of this fnger and of Margarita de l'Epine gave rise to the firft musical fictions which we hear of in this country. According to Hughes, author of the Siege of Damas, their abilities were disputed by the firft people in the kingdom.

"Music has learnt the discord of the flate,
And cencers jat with Whig and Tory hate.
Here Somerfet and Devonshire attend
The British Tofts, and ev'ry note commend;
To native merit just, and pleasd to fee
We've Roman arts, from Roman bondage free.
There fam'd l'Epine does equal skill emply,
While lil'ning peers crowd to th' celtial joy:
Bedford to hear her fong his dice forfakes,
And Nottingham is raptur'd when the fakes;
Lull'd flatefmen melt away their drowsy cares
Of England's safety, in Italian airs!"

Although it is publicly infinuated in the Tatler, for Thurs-
day, May 26, 1709, that Mrs. Tofts was infame, it seems doubtful whether we are to take this account literally, or whether
whether Sir Richard Steele had not recourse to invention, or at least exaggeration, in order to throw a ridicule on opera quarrels in general, and on her particular disputes at that time with the Margarita or other female fingers. See Taliot, p. 226.

After quitting the stage, by which she is said to have acquired a considerable fortune, the married Mr. Joseph Smith, who was afterwards appointed confidant at Venice, where he resided till the time of his death, about the year 1705. He was a great collector of books and pictures, and a patron of the arts in general.

TOGA, in Ancient Geography, a town of Asia, in Greater Armenia. Tptl.

Toga, in Antiquity, a wide wooden gown, or mantle, without sleeves, used among the Romans, both by men and women.

In process of time, none wore the toga but lewd women: whence that of Horace, in matrona, aeculis, paecefoe toga. Lib. i. fat. ii. ver. 63.

The toga was of divers colours, and admitted of various ornaments: there was that called toga domifcia, worn within doors; toga coronata, worn abroad; toga militaria, used by soldiers, stuck up after the Gabiniian fashion; and toga pilâ, or triumphalis, wherein the victorious triumphed: this was embroidered with palms: that without any ornaments was called toga pura.

The toga pilâ, &c. was an ancient habit of the Etruscans, and not brought to Rome till after Tarquinius Priscus had subdued the twelve states of that nation.

The toga was sometimes worn open, and called aperta; sometimes gilt or stuck up, called praecincta; and this clture or girding, again, according to Sigonius, was of three kinds: laticius, or the loose kind, where the tail trailed on the ground; adstringens, the close kind, wherein it did not reach so low as the feet; and laticinia, where one of the skirts or lappets was girt round the body.

Sigonius distinguishes the several togas, or Roman gowns, into pura, candida, pulia, pilâ, praecincta, trabea, and galadamentum. See Praedexta, Paludamentum, &c.

The toga pura was also called virilis. Kennet's Rom. Ant. part ii. c. 8.

Toga is sometimes used metaphorically for peace. See Trope.

Togz, Jus, or privilege of the toga, was the same with the privilege of a Roman citizen, i.e. the right of wearing a Roman habit, and of taking, as they explain it, fire and water through the Roman empire.

TOGAWADI, in Geography, a town of Hindoostan, in Baramaul; 7 miles S. of Sankeryhurgan.

TOGDA, or TIGDA, a town and district of Africa, in the country of Segulmeza; 50 miles W. of Segulmeza.

TOGEBAUT, a town of Peria, in the province of Ege; 81 miles N. of Ifahpan.

TOGETHER, in Sea Language, the order given to the men in the exercizes of heaving, rowing, twilng, &c. to act all in concert, or at the same instant.

TOGGEI, in a Ship, a small wooden pin, about five or six inches long, and usuallly tapering from the middle toward the extremities. It is used to fix transversely in the lower part of a tackle, in which it serves as a hook whereby to attach the tackle to a strop, lings, or any body in which the effort of the tackle is to be employed.

There are also toggels of another kind, employed to falten the top-gallant sheets to the span, which is knotted round the cap at the top-mast-head. Fel.see Butoffs.

TOGGEBURG, in Geography, a county of Switserland, dependent on the abbey of St. Gal, bounded on the N. by the territory of St. Gal, on the E. by the canton of Appenzell, on the S. by the county of Sargans and the territory of Calfer, and on the W. by the canton of Zürich. In its natural quality it resembles Appenzell and the other cantons, and, being full of fertile Alps, abounds in numerous breeds of cattle. Till the year 1436, this county had its own counts; the last of whom carried his indulgence to his vassals so far, as to grant them such privileges as nearly amounted to a state of absolute freedom: accordingly, on his demise in the above year, they entered into a close alliance with the cantons of Schweitz and Glaris, which alliance was confirmed in 1440. Afterwards, the county was received into an alliance with the cantons of Schweitz and Glaris, and likewise gave its function to the former compact between the inhabitants of the county and the said cantons. In the beginning of the eighteenth century, the Togggenburgers, resenting the illegal and oppressive exactions of abbot Leodaurius, applied for assistance to their allies, who readily granted it; and, in 1707, Zurich and Bern also declared, that they would maintain the county of Togggenburg in the secure enjoyment of its rights and liberties, against all illicit violence whatsoever. On this the people began to affer their rights, and, in 1707, in a solemn congress, held at Wattey, renewed their federal oath, and erected three councils, named the great, lesser, and privy, which are composed of an equal number of members of both sexes. The intifine commotions here continued however to increase, till, in 1712, they broke out into open war, in which Zurich and Bern sided with the county, and Schweitz and Glaris with the abbot. In 1718, at Baden, in the Argau, an accommodation, confirming the liberties of the county, was brought about between the new abbot and the cantons of Bern and Zurich. Pursuant to this peace, the abbot and prince of St. Gal both is, and bears the title of, natural sovereign, and territorial lord of the county of Togggenburg; and the people are to take the accustomed oath to him, and to pay him suitable services, but without any violation of their rights and liberties.

TOGLUTOUR, a town of Hindooftan, in the fubd of Deli; 15 miles W.N.W. of Panniput.

TOGOMI, a town of Japan, in the illand of Nihon; 80 miles N.W. of Meaco.

TOGOSOHALCHEE CREEK, a branch of the Oak-mullee river, in the flate of Georgia.

TOGRIN, CAPE, a cape at the mouth of the river Sierra Leone.

TOGULA, among the Romans, a narrow kind of toga, used by the poorer sort of people.

TOHBA, a denomination given to a class of priests in their age, or nine years, into the establishment, called "Totha," and they are then occupied in receiving the instructions suited to their age, and the duties for which they are designed. At fifteen they are usuallly admitted into the order of Tohba, the first step in their religious class, and after due examination, they are advanced from the order of Tohba to that of Gylong, between the age of twenty-one and twenty-four. See Gylong.

TOHOTCHIE HOTUN, in Geography, a town of Chinefe Tartary, in the country of Hami; 30 miles N.W. of HamiHotun.

TOJIE, a town of Hindooftan, in Candeif; 10 miles N. of Hurdah.

TOIKO,
TOK

TOIKO, a town of Japan, in the island of Nippon; 80 miles E.S.E. of Jedo. N. lat. 36° 51'. E. long. 140° 40'.

TOILES, snakes or nets set by hunters for catching of wild beasts; as deer, &c.

TOILET, a fine covering, of linen, silk, or tapestry, spread over the table in a bed-chamber, or dressing-room, to undress and dress upon.

The dressings-boxes, in which are kept the paints, pomatum, essences, patches, &c. the pin-cushion, powder-box, brushes, &c. are esteemed parts of the equipage of a lady's toilet.

That of the men consists of comb-cape, brushes, &c.

To make a visit to one at his toilet, is to come to entertain him while he is dressing or undressing.

Satin, lace, velvet, brocade, point de France, &c. are now ordinarily used for toilets; anciently they were made much plainer: whence the name, which is formed from the French, toilette, a diminutive of voile, any thin stuff.

TOISE, or FATHOM, a long measure in France, containing 6 feet, the foot being 12 inches, the inch 12 lines, subdivided into 12 points; 76 French feet are equal to 81 English feet, or, more accurately, 4000 French feet equal 426 English feet.

TOISON d'Or, a term, in Heraldry, for the golden fleece, which is sometimes borne in a coat of arms.

TOISSEY, in Geography, a town of France, in the department of the Ain, near the Chalaronne and Saône, which unites about half a mile from the town; 18 miles W. of Bourg-en-Bresse.

TOJUCA, a river of Brazil, which runs into the Atlantic, S. lat. 27° 44'.

TOKA, a town of Hindostan, in the circonference of Aurungabad; 33 miles S.W. of Aurungabad.

TOKAI, a river of Bucharia, which runs into the Gihon, near Heifdar-apf.

TOKARESTAN, a district of Grand Bucharia, situated to the eastward of Balk.

TOKAY, a town or rather village of Hungary, situated at the foot, and to the E. of a high hill, close by the confluence of the river Bodrug with the Theiss or Tibiscus. The inhabitants are chiefly either Hungarians of the Protestant religion, or Greeks, who came originally from Turkey, but have been long settled here, for the purpose of carrying on the wine-trade. The hills on which the vine grows lie all to the W. of the river Bodrug, and beginning close by the town of Tokay, extend westward and northward from thence, and occupy a space of perhaps ten English miles square; but they are interrupted and interplayed with many extensive plains, and several villages. Near some of these, particularly Tabia and Tarzcal, the wine is better than that which is produced on the hill of Tokay; but it all goes under the same name; 98 miles N.W. of Colofvar. N. lat. 48° 10'. E. long. 10° 57'.

Tokay-Wine, derives its name from the town or village of Hungary, where it is produced. (See the preceding article.) The vineyards extend beyond the forty-eighth degree of northern latitude; the soil where the vines grow is a yellow clayish earth, extremely deep, and interposed with large loose lime-flakes: the expasures most inclining to the south, the steepcl declivities, and the highest parts of these, produce the best wine. This wine, so far from being found in so small a quantity as never to be genuine, unless when given in presents by the court of Vienna, is a common defect wine in all the great families at Vienna and in Hungary, and is very generally drank in Poland and Russia; nor is the Tokay wine altogether the property of the crown, but many of the German and Hungarian nobility, as well as gen-

TOK

TOK

THEMEN, and even peasants, have vineyards at Tokay. The grapes are all white, and the vintage commonly begins about the 28th of October, sometimes as late as the 11th of November. There are four sorts of wine made from the same grapes, distinguished at Tokay by the names of essence, aufruch, masfach, and the common wine.—The essence is made by picking out the half-dried and shriveled grapes, and putting them into a perforated vessel, where they remain as long as any juice runs off by the mere pressure of their own weight. This is put into small casks. The aufruch is made by pouring the expressed juice of the grapes from which the former had been picked on those that yielded the essence, and treading them with the feet. The liquor thus obtained stands for a day or two to ferment, and then is poured into small casks, which are kept in the air for about a month, and afterwards put into the cellars. The same process is again repeated by the addition of more juice to the grapes which have already undergone the two former preflies, and they are now wrung with the hands; and thus is had the masfach. The fourth kind is made by taking all the grapes together at first, and submitting them to the greatest preffure: this is chiefly prepared by the peasants. The essence is thick, and very sweet and luscious; it is chiefly used to mix with the other kinds. The aufruch is the wine commonly exported, and which is known in foreign countries by the name of Tokay. The goodness of it is determined by the following rules. The colour should neither be reddish nor very pale, but a light silver; in trying it, the palate and tip of the tongue should be wetted without swallowing it, and if it manifest any acrimony to the tongue, it is not good; but the taste ought to be soft and mild: when poured out, it should form globules in the glass, and have an oily appearance: when genuine, the strongest is always of the bell quality: when swallofed, it should have an earthy afflignant taste in the mouth, which is called the taste of the root. All Tokay wine has an aromatic taste, which distinguishes it from every other species of wine. It keeps to any age, and improves by time; but is never good till about three years old. It is the best way to transport it in casks: for when it is on the seas, it ferments three times every season, and thus refines itself. When in bottles, there must be an empty space left between the wine and the cork, otherwise it would burst the bottle. A little oil is put upon the surface, and a piece of bladder tied over the cork. The bottles are always laid on their sides inland. Phil. Trans. vol. liii. part ii. p. 292, &c.

TOKE, in Geography, a town of Bengal; 35 miles N.E. of Dacca.

TOKEN-BESSEYS, a cluster of small islands in the East Indian sea. S. lat. 6°. E. long. 123° 36'.

TOKENS, in Byzantine Cursed, those livid spots which appear in the several stages of the disease, and are certain forerunners of death. They generally appear only under the most desperate circumstances, and when the patient would otherwife be declared dying; but Hodges gives us instances where they appeared before any other symptoms of the disease, and came out without any pain or trouble; yet even in these cases the perfon always died. These tokens are the mark by which the searchers conclude of the cause of the death of the perfon, and are the rule for ordering the house to be shut up, to prevent the spreading of the disease. But the nurses, and other crafty people, have a way of disguising the symptom after death, by covering the body with wet and cold sheets. These strike in the spots, so that the perfon may be thought to have died by some other disease.

TOKENS, False, in Law. See False.

TOKENS, in Coinage, coins in the reign of queen Elizabeth. 5 F
struck in the cities of Bristol, Oxford, and Warehall, and also by about 5000 trade-men and others; upon returning which to the issuer, he gave current coin, or value, for them, as directed. In the succeeding reign, on the 15th of May, 1613, king James's royal farthing tokens commenced by proclamation. These were not forced upon the people as farthings or established coin, but merely as pledges or tokens, for which government was obliged to give other coin if required. Their legend was the king's common terms running upon each side. These pieces were not favourably received, but continued in a kind of retentent circulation through the whole of this reign, and the beginning of the succeeding. In 1635, Charles I. struck those with the roe instead of the harp. But the vast number of counterfeits, and the king's death in 1648, put an utter flop to their currency; and the tokens of towns and trade-men again took their run, increasing prodigiously till the year 1672, when farthings properly so called were first published by government. These town-pieces and trade-men's tokens, together with those of the time of queen Elizabeth, are collected by some antiquaries with great avidity. Similar tokens, says Pinkerton, are to this day current in Scotland, both of copper and tin, principally used by the bakers and grocers; farthings not being very common in that country.

In 1804, the Bank of Ireland bought in a large quantity of depreciated silver coin; and, as a substitute, issued Spanish dollars, newly stamped, at 6½ Irish, and also fractions of the dollar, which had been minted for the occasion at the Tower of London, consisting of five-penny, ten-penny, and thirty-penny pieces Irish, being exactly 1/6, 1/3, and 1/6 of the dollar. All these coins are called Bank tokens; the Bank having engaged to receive them again at the issued price, and they have been declared a legal tender in the payment of taxes: their intrinsic value may be known from that of the dollar. In 1829, a new silver coinage was minted at the Tower of London for the colonies of Ellice and Demerary, consisting of pieces of 3, 2, 1, ½, and ¼ of the dollar: the larger piece weighs 15 dwts., and is 1 oz. 6 dwts. worse than English standard. Its value therefore is 32. 5d. sterling, or, computing it as the dollar is now rated in the West Indies (i.e. at 45. 5d.), its value is 32. 5½d. and the smaller pieces in proportion. They are marked on the reverse "Colonies of Ellice and Demerary Token," and the king's is on the obverse. The exchange with London should be about 12 guilders for 1l. sterling, but varies considerably above this, even to 20 guilders, and upwards. Kelly's Cambist.

TOKIS, in Geography, a town of Japan, in the island of Nippon; 40 miles N.N.E. of Meaco.—Also, a town of Japan, in the province of Ximo; 15 miles N.N.W. of Nangafaki.

TOKI-TAO, a small island near the coast of China. N. lat. 38° 4'. E. long. 120° 39'.

TOKORARI. See Tocorary.

TOKTABA, a town of Bootan; 50 miles N. of Beyhar.

TOL in Law, a term signifying to defeat, or take away. From the Latin, tollere, which signifies the fame. Thus, to tol the entry, is to take away the right of entry.

TOL Peden Penwith, in Geography, a cape on the S. coast of the western extremity of Cornwall; 3 miles S.E. of Land's End. N. lat. 50° 4'. W. long. 5° 36'.

TOLA, in Commerces, a weight for gold and silver at Bombay, Surat, and other places in India: at Bombay, the tola contains 40 vails, 100 gonsie or Bombay grains, or 600 chowees. The tola is equal in weight to the silver rupee; 24 tolas make 1 seer, and 32 tolas 13 valls = 1 lb. troy. At Surat, the tola contains 32 valls or 96 ruettes: 82½ valls make 1 oz. troy, and therefore 31 tolas 1 lb. troy nearly.

TOLABO, CAPE, in Geography, a cape on the E. coast of Celebes. S. lat. 9° 45'. E. long. 122° 50'.

TOLAGO BAY, a bay on the N.E. coast of the northern island of New Zealand, in the South Pacific ocean, discovered by captain Cook in the year 1769. It is moderately large, and has from seven to thirteen fathoms, with a clean sandy bottom and good anchorage, and is sheltered from all winds except the north-east. On the south point lies a small but high island, so near the main as not to be distinguished from it. Close to the north end of the island, at the entrance into the bay, are two high rocks; one of which is round, like a corn-flack, but the other is long, and perforated in several places, so that the openings appear like the arches of a bridge. Within these rocks is a cove, convenient for wood and water. Off the north point of the bay is a pretty high rocky island; and about a mile without it, are some rocks and breakers. The tide flows at the full and change of the moon, about fix o'clock, and rises and falls perpendicularly from five to fix feet. Captain Cook saw no four-footed animals, nor the appearance of any, either tame or wild, except dogs and rats, and these were very scarce: the people eat the dogs, as at Otaheite, and adorn their garments with the skins. He climbed many of the hills, hoping to get a view of the country, but could see nothing from the top except higher hills, in a boundless succession. The ridges of these hills produce little besides fern; but the sides are most luxuriantly clothed with wood and verdure of various kinds, with little plantations intermixed. In the woods he found trees of above twenty different sorts, and carried specimens of each on board; but there was nobody to whom they were not altogether unknown. The tree cut for firing was somewhat like the maple, and yielded a whitish gum. Another sort was found of it, of a deep yellow, which might be useful in dying. One cabbage-tree was met with, and cut down for the cabbages. The country abounds with plants, and the woods with birds in an endless variety, exquisitely beautiful, and of which none of them had the least knowledge. The soil of both the hills and valleys is light and sandy, and very fit for the production of all kinds of roots; though none were seen except sweet potatoes and yams. S. lat. 38° 22'. W. long. 181° 15'.

TOLAND, JOHN, in Biography, a writer on subjects of political and religious controversy, was born in the year 1669, in Ireland, near Londonderry; and his parents, of a good family, were Roman Catholics. Educated in the principles of his family, he renounced them before he attained the age of sixteen years, and became a zealous opposer of popery. Accordingly he completed his education in Scotland, and having spent three years in the university of Glasgow, removed to Edinburgh, where he graduated M.A. in 1690. From Edinburgh he removed to London, and became acquainted with some respectable dissenters, who enabled him to pursue his studies for two years more at Leyden. On his return to London, he visited Oxford, and here he collected materials for the execution of some literary projects: one of which was a dissertation in order to prove that the common narrative of the death of Regulus was a fable. In 1696 he published at London his "Christianity not mysterious; or a Treatise shewing that there is nothing in the Gospel contrary to Reason, or above it; and that no Christian Doctrine can be properly called a Mystery," This publication caused an alarm, and not without reason, among
among Christians of all denominations, by whom it was regarded as an attempt to overthrow revealed religion. At home and abroad it excited attention, and the advocates of Christianity concurred in the defence of their religion against what they conceived to be an attack upon it. The magistrates, also, intruded into this controversy, and procured a preceptment by the grand jury of Middlesex. The author withdrew from the Horn which seemed to be gathering into his own country; but the obnoxious character of his book had excited prejudices against him. Toland, as we learn from the correspondence between Mr. Molyneux and Mr. Locke on the subject, does not seem to have acted with that moderation and prudence which might reasonably have been expected in his circumstances. His manner of defending and propagating his opinions gave just offence even to those who entertained some degree of respect for his talents and learning; and was condemned by those who were avowed advocates of rational liberty and enemies to every kind of persecution. From another quarter he experienced a severity of treatment, which his own misconduct had provoked, but which, in this more enlightened and liberal period, none, we presume, will undertake to justify.

In defense of Toland’s book, by Mr. Peter Brown, fellow of Trinity college, the civil magistrates was called upon to interpose; accordingly the grand jury of Dublin made a preceptment of the book; the parliament of Ireland voted it to be burnt by the common hangman, and issued an order that the author should be taken into custody by the jeer that was at arms, and prosecuted by the attorney-general.

Toland, universally blamed by his acquaintance, and reduced to pecuniary difficulties, left the country, and returned to England. While some disapproved the violence of this proceeding, others justified it; and Dr. South, in particular, highly commends the Irish parliament for having “to their immortal honour, presently sent him (Toland) packing, and, without the help of a faggot, soon made the kingdom too hot to hold him.” On the spirit which dictated this language we make no comment. Toland, upon his arrival in London, published an account of his treatment in Ireland, and renouncing communion with the Dissenters, declared himself a latitudinarian, or one who would comply with the religious worship of any class of Protestants, whose differences were not, in his estimation, of sufficient importance to justify disturbing the peace of a nation. He then directed his attention to other topics; and in 1698 he published a pamphlet, intitled “The Militia reformed,” in which he proposed to substitute that species of armament for a standing army. In the same year he wrote a “Life of Milton,” to be prefixed to an edition of his prose works, and which was also printed separately. In this preface he opposed the notion then prevalent, that the “Icon Basilikè” was written by Charles I.; and from the consideration of this imposture, as he pronounced it to be, he digressed to the consideration of the purer works that had been ascribed to Christ and his apostles. Against a host of political and religious adveraries, he defended himself in a treatise intitled “Amynstor;” in which he gave a complete history of the “Icon Basilikè,” and also a catalogue of such primitive writers, who were judged by him to be pious. As he was supposd in the discussion of this latter topic to impugn the authenticity of the received canon of Scripture, he drew forth replies from some of the ablest advocates of Christianity, and particularly Mr. (afterwards the highly celebrated Dr.) Samuel Clarke.

In 1699, Toland was engaged by the duke of Newcastle to publish “Memoirs of Dzenil Lord Holles;” and in the following year by Mr. Robert Harley, afterwards Earl of Oxford, then a Whig, to give a new edition of Harrington’s “Oceana.” When the Act of Succession was passed, on occasion of the death of the duke of Gloucester in 1701, he published “Anglia Libera,” being an explanation and eulogy of this act; and he accompanied the Earl of Macclesfield, who was deputed to carry it to Hanover, and had the honour of presenting his book to the Electress Sophia, and of kissing her hand on the occasion. At Berlin, where he visited, he held a disputé, before the queen of Prussia, with the learned Beaufobre, on the authority of the books of the New Testament; on an account of which was sent by the latter to the “Bibliothèque Germanique.” Upon his return to England in 1704, he published “Letters to Serena;” (meaning the queen of Prussia,) on the origin and force of prejudices; the history of the soul’s immortality among the heathens; the origin of idolatry; and remarks on Spinoza’s philosophy. These letters were animadverted upon by Wotton, and by the author of the Divine Legation. In 1708 he published at the Hague two Latin dissertations, entitled “Adelphidæmon, &c. Titus Livius a Superflitione vindicatus;” and “Origines Judææcæ, five Strabonæ de Moïye et Religione Judæææ História breviter illustrata.” In 1718 he published “Nazaræus; or Jewish, Gentile, or Mahometan Christianity,” &c. in which he endeavours to shew that the Jewish converts were to observe their own law throughout all generations, &c. Two years afterwards appeared a Latin tract, entitled “Pantheïcæ; five Formulae celebræ Sodalitatis Sorœtæ, &c.;” a work which has subjected its author to the charge of atheism, and in consequence of which he was unjustly accused by Dr. Hare with having composed a profane prayer to Bacchus in his character of Pantheist.

In the same year he published his “Tetraëdromus,” on the pillar of cloud and fire that guided the Israelites; on the exoteric and esoteric philosophy of the ancients; on Hypatia, the female philosopher; and a defence of his Nazaræus against Dr. Mangey. To this work he annexed an account of his conduct and sentiments, formally professing his preference of the Christian religion, pure and unmixed, to all others.

Toland’s health was now declining, and being in low circumstances, Lord Moleworth assured him that he should never want, while he himself lived. However, his disfavour baffled all remedies, and his life closed on the 11th of March, 1722, in the 53d year of his age. He manifested a considerate degree of resignation and patience during the progress of his illness; replying to one who asked him if he wanted anything, “I want nothing but death;” and after taking a calm leave of his friends, saying to them that “he was going to sleep.” In an epitaph which he prepared for himself, he expresses that confidence and self-approval which belonged to his character. He closes with these words: “Spiritus cum aethero patre, a quo proletis omne, conjuncturus; corpus imitatur; natura cecidit, in materno grimo repromitor. IPSA vero exterrum et referreturca, at idem futurus Tolandus nuncum.” His posthumous works were published in 2 vols. 8vo. in 1726, and again in 1747, with an account of his life and writings, by Des Maizieux.

Biog. Brit. 

TOLANORE, in Geography, a town of Hindooftan, in the Carnatic; 5 miles N. of Volcunda.

TOLASTRA REGIO, in Ancient Geography, a country of Asia, in Galathia. Ptolemy.

TOLBIACUM, a town of Gallia Belgica, according to Tacitus; situated on the route from Treviri to Colonia Agrippina.

TOL-BOOTH, or TOL-BOOTh, a place in a city, where goods are weighed, to ascertain the duties or import on them.

5 F 2 TOLCES.
TOLCESTER, Tolcestum, in our Old Writers, an old excise, or duty paid by the tenants of some manors to the lords, for liberty to brew and sell ale.

TOLCKSDORF, in Geography, a town of Prussia, in Ermeland; 12 miles S.E. of Fraunenburg.

TOLEDO, in Geography. See Alva.

Toledo, in Geography. A city of Spain, in New Castile, on the Tagus, the see of an archbishop, and an university, founded in the year 1475. The origin of Toledo is uncertain; it is only known to have been a Roman colony, and made the depositary of the treasures sent from Rome. From the Romans it passed under the dominion of the Goths; Leovigild retired there and embellished the city, which became more considerable under his successors. The Moors took Toledo in 584, and reigned there till 1085, when it was taken from them by Alphonso VIII., who styled himself emperor of Toledo, whence it took, and has preserved, the title of royal and imperial. Toledo, as is well known, was formerly famous for the exquisite temper of the sword-blades made there; and the genuine ones that still remain are sold at an exorbitant price. It is said that the secret of hardening them has been again recovered; and experiments have been made with blades lately fabricated there which seem to justify this assertion. When one of these has undergone the operation of tempering, if it be in the least notched, by striking with it several violent blows on an iron head-piece, it is rejected: almost all that are made here, it is said, will fland this proof. Two centuries ago, Toledo contained more than 200,000 inhabitants, but now scarcely 30,000. When a house falls to decay, it is never rebuilt; and in 20 years more, this city will be little else than a heap of ruins. Toledo is built upon rocks, and commanded by eminences which seem to present the image of sterility; yet, in the midst of these precipices, the traveller finds, to his surprize, several fertile and charming situations, impenetrable to the burning rays of the sun. These places are called Cigarrates. Several councils have been held at Toledo, particularly one in 623, in which it was declared unlawful and unchristian to force people to believe, seeing it is God only who hardens, and flews mercy to whom he will; but by another council in a few years after, they highly commended their monarch for persecuting the Jews. In 681 it was decreed, that the archbishop of Toledo should have power to create bishops throughout Spain in the king's absence, and confirm those made by the king. In 1355, it was feized by Henry and Frederick, the haillards, brothers of king Peter, who robbed all the Jews, and murdered about 1000 of them; 32 miles S.S.W. of Madrid. N. lat. 39° 56'. W. long. 4° 18'.

TOLEN, a town of Norway; 22 miles W. of Bergen.

Alo, an island belonging to the flate of Zealand, in the calf branch of the Scheld, separated from the main land of Brabant by a canal, about ten miles in length, and four in breadth. It contains two towns, Tolon and St. Martin's Dyack, and several villages. Tolon, the capital, from whence the island itself is named, is a handsome town, and ranks as fourth in the assembly. The name of it is derived from the toll which was formerly paid here by order of the counts of Zealand. It is fortified with seven bastions, and the flates have caused a fort, called Suckenburg, to be built on the other side of the river, so that it is now one of the strongest frontier towns of the flate of Zealand. The flateau is an armed building, which makes a good show. The arsenal is situated at the entrance of the small harbour; there is also a magazine for powder. The church is built in the figure of a cross, and is an extraordinary piece of architecture: 4 miles N.W. of Bergen-Zoom. N. lat. 51° 36'. E. long. 3° 58'.

TOLENTINO, a town of the Poppedom, in the marquisate of Ancona, on the Chiento, the see of a bishop, united to Macerata. It is only remarkable for being the depositary of the body of St. Nicholas, where the arm, by bleeding afresh, prognosticates when any signal calamity is to befal Italy; 18 miles W. of Fermo. N. lat. 43° 10'. E. long. 13° 18'.

TOLENTINO, in Ancient Geography, a town of Italy, in Picenum, S.W. of Ricina.

TOLenus, a river of Italy, in the country of the Marit.

TOLeration, in Religion, a term which has engaged much attention in the disputes among Protestants.

M. Bafiano, and some others, distinguishing civil toleration from ecclesiastical. The latter allows of different, and even opposite sentiments in the church; and the first permits them in civil society.

TOLeration, by civil toleration, is meant impunity and safety in the state for every sect which does not maintain any doctrine inconsistent with the peace and welfare of the state. This civil or political toleration, implies a right of enjoying the benefit of the laws, and of all the privileges of the society, without any regard to difference of religion.

Ecclesiastical toleration is an allowance of certain opinions, which, not being fundamentals, do not hinder those who profess them from being esteemed members of the church. But as to the quality and number of these fundamental points, they never could, nor in all probability ever will be agreed upon.

In order to discover the genuine principles of toleration, it is necessary to consider that, antecedently to the formation of civil societies, mankind professes certain rights, independent of all human grant, not derived from any compact, and which are therefore to be acknowledged as the rights of human nature. A right to judge for themselves in points of religion is one of these rights; which, whilst it authorizes every individual to claim the exercise of this privilege to himself, obliges him to allow it in the same extent to all about him, and establishes one uniform regulation for his behaviour toward others, and their behaviour toward him; e.g. no apprehensions of the truth and certainty of any person's religious sentiments can justify him in attempting to impose them on his neighbour; for the same right of judgment which any one can claim, belongs, on the same principle, equally to all, and ought to be equally faced and inviolable in all; and no reason can be alleged by him for taking the religious liberty of others from them, but what will, at the same time, equally destroy his own title to it. The injustice of similar encroachments upon him from others follows from the same principle, and with the same evidence.

Whether the claim of such a liberty of judgment in religion for ourselves is weakened by men's entering into civil society, is the next object of consideration.

The great end of government is to protect the subjects of it from the injuries to which they were exposed in a state of nature; and as all injuries imply rights of which they are violations, and the care taken to guard against the violation of these rights is an acknowledgment of the reality and importance of them; it evidently follows, that when they enter into society, if the primary and leading view of government be to prevent or restrain these injuries, to which men were exposed for want of its protection, they carry these rights with them; that they continue to retain them; and that, instead of supposing themselves to be deprived of them, the very design with which they put themselves under the authority of government is to secure them the more firmly.

With this view they entrust the preservation of them to common guardians, by whose intervention, it is presumed, they will be more vigorously affected and more effectually protected, than it is possible they should be in a state where there
there is no common umpire to check the evils of oppression on the one hand, and refrain the no less formidable evils of immoderate resentment on the other.

If we consider what are the rights which men give up to government, when they enter into civil societies, they will be found to be, not those which may most properly be styled the primary rights of human nature; not the right which every man has to live undisturbed, to enjoy the advantages which he justly possesses, and to be left to his freedom in all things not injurious to his fellow-creatures; but the consequential, though equally real and certain right, which men are not subject to government, every person has to take the affection of all his rights into his own hands, and correct the infringers of them by the inflicting of such pains, or the use of such other methods of determining the authors of the wrong, as reason shall warrant for his future security; and, speaking precisely, even these rights are not absolutely extinguished and utterly lost, but suspended by such limitations as the order and well-being of society require, and so long as the succours of government shall be effectual.

The primary rights of liberty, safety, and protection from oppression, still subsist in their full vigour. To suppoze them abandoned, renounced, and annihilated, or that government can have any right to destroy them, is ascribing to it a right to defeat the end for which it is established, and betray the trust reposed in it. It is, indeed, totally inverting the principle upon which the power of rulers stands, and by which the acts of it ought to be guided.

Man was not made for government, but government for man; and the great object, to which all the operations of it should be directed, is to guard, as much as possible, the equal, impartial safety and freedom of all the subjects of it. To this purpose judge Blackstone observes, that the principal aim of society is to protect individuals in the enjoyment of those absolute rights, which were vested in them by the immutable law of nature, but which could not be preserved in peace without that mutual assistance and inter-course, which are gained by the institution of friendly and civil communities: so that the primary end of human laws is to maintain and regulate these absolute rights of individuals.

See Government and Civil Liberty.

Now of all the rights inherent in human nature, that of thinking for ourselves, and following the conviction of our own judgments in relation to the object of our faith, worship, and religious obedience, is the most sacred, incontestable, and in every view of it, entitled to the most careful protection. The preservation of these is one of the chief, perhaps the first end for which civil societies are instituted, and the rulers of them invested with power: and therefore, in all governments, the rights of conscience should have a principal place assigned them in the care of those, to whom the protection of their fellow-creatures is committed. If the securing of equal, impartial liberty, in all those instances of it in which it is not injurious to others, be so much the object of every equitable, wise, and well-considered system of laws, that all needful encouragements upon it are deviations from the spirit which ought to be diffused through all laws, and impair the benefit which they ought to confer, can it be supposed that the rights of conscience ought not to be guarded from violation? Rights of this kind are the last which men can ever be imagined to give up to be modelled at the pleasure of others; nor (as it is argued) is there any one principle connected with their submission to governors in other respects, that can require or justify such a surrender. Does it follow that, because the magistrate is entrusted with authority to decide disputes between us and our fellow-citizens concerning property, he is to determine

points which lie only between God and our own consciences? Because it is allowed to be his office to guard the peace of his subjects, and to inflict punishments for this purpose on those who unjustly disturb it; is it to be taken for granted, that he is to dictate to them what rule of faith they shall adopt, and in what manner they are to worship the Deity; when it is allowed on all hands, that of these things the will of God is the only rule, and that no worship can be acceptable to him, but what is accompanied with the sincere conviction of him who offers it? Besides, it is argued, that such is the nature of this right, and it holds upon a foundation peculiar to itself, and is distinguished from every other right, that it cannot be given up. Property may be resigned, transferred, or submitted to the regulation of others; a man may relinquish his cafe, and subject himself to inconveniences, and be not only innocent but laudable; nay, he may sacrifice life itself, and merit the highest applause; but his conscience he cannot resign.

To "prove all things, and hold fast that which is good," is not only a privilege but a duty; an obligation laid upon him by the very nature of religion and virtue, and from which he cannot discharge himself without departing from the principles of both. It must always remain entire to him; nor, while the principles of the most reasonable liberty are allowed to subsist in their due extent, can any attempt be consistently made to take it from him.

From these principles it has been inferred, that toleration, so far from being a matter of mere grace or favour, which government has a right to withhold, grant, abridge, or refuse at pleasure, is the acknowledgment and confirmation of a right: not one of those adventitious rights, which are subsequent to the establishment of civil societies, and arise out of the peculiar forms and constitution of it; but of those higher rights which belong to men as such, and which ought to be preferred under all states and governments whatever, as effectually, universally, and impartially as any other right.

With regard to the extent of toleration, it is urged, that if liberty of conscience be a right essential to human nature, all penalties in cases merely of a religious nature must be an infringement of a right, and a degree of oppression, though inflicted by a law. Further, the inquiry concerning the persons entitled to toleration does not depend on the supposed truth or error of the sentiments which men may adopt, but upon the common right, which all men have, to be led in these points by the light of their own minds, and to enjoy all the securities and benefits of society, while they fulfill the obligations of it. All who can give good security to the government under which they live, and to the community to which they belong, for the performance of the duties of good subjects and good citizens, have an undoubted claim to it, and cannot with any just reason be deprived of it.

It is not error, but injury to the state, or the individuals who are under the care of it, which justifies the animadversion of the magistrate; and all to whom this cannot be justly imputed, are the objects of his protection.

Archdeacon Paley distinguishes two kinds of toleration: the one partial, which is the allowing to differents the unmodelled profession and exercise of their religion, but with an exclusion from offices of trust and emolument in the state; and the other complete, which is the admission of them, without distinction, to all the civil privileges and capacities of other citizens. The justice and expediency of toleration in general is founded by this ingenious writer primarily in its conduciveness to truth, and in the superior value of truth to that of any other quality which a religion can possess.

Besides this principal argument for toleration, there are other
other auxiliary considerations that are important. The
restrictive of the subject to the religion of the state is a
needless violation of natural liberty, and in an instance with
regard to which it is always grievous. Persecution
produces no sincere conviction, nor any real change of
opinion; on the contrary, it vitiates the public morals, by
driving men to prevarication, and commonly ends in a
general though secret infidelity, by imposing, under the name of
revelled religion, systems of doctrine, which man cannot
believe, and dare not examine; finally, it disgraces the char-
acter, and wounds the reputation of Christianity itself, by
making it the author of oppression, cruelty, and bloodshed.
Our author includes under the idea of religious toleration
the toleration of all books of serious argumentation, without
deeming it any infringement of religious liberty to restrain
the circulation of ridicule, invective, and mockery upon
religious subjects.

Concerning the admission of dissenters from the established
religion to offices and employments in the public service,
which is necessary to render toleration complete, doubts, says
Dr. Paley, have been entertained with some appearance of
reason. In vindication of these doubts, he refers to those
who hold religious opinions that are utterly incompatible
with the necessary functions of civil government; enthusiasts,
who maintain that all distinction of property is abolished by
Christianity, and that the gospel enjoins upon its followers a
community of goods; and to Quakers or Friends, who be-
lieve it to be contrary to Christianity to take up arms. He
allows, however, that with the single exception of refusing
to bear arms, the various acts of Christians which actually
prevail in the world hold no tenet which incapacitates men
for the service of the state. It has indeed been asserted,
that disunity of religions, even supposing each religion to be
free from any errors that affect the safety or the con-
cuct of government, is enough to render men unfit to act
together in public stations. But upon what argument, or
upon what experience, is this assertion founded? “I per-
ceive no reason,” says this liberal writer, “why men of
different religious persuasions may not fit upon the fame
bench, deliberate in the same council, or fight in the same
ranks, as well as men of various or opposite opinions upon
any controverted topic of natural philosophy, history, or
ethics.” For a further account of this author’s sentiments on
toleration and collateral subjects, see RELIGION, Sub-
scription, and Test-Act.

To the term Toleration, though it has been adopted by
Mr. Locke and several writers of the first distinction, others
have objected; alleging that, as words have a considerable
influence on opinions, this term appears to be injurious to
that religious liberty, which it is designed to import. It
implies a right to impose articles of faith, and modes of
worship; that nonconformity is a crime; and that the suf-
ferrance (toleration) of it is a matter of favour or lenity.
But the nonconformist in every country, whether he be a
Christian at Constantinople, a Protestant at Rome, an Epis-
copalian in Scotland, or a Presbyterian in England, and,
we may add, a Catholic in any part of Great Britain, if his
rational principles be consonant to his practice, will regard
this claim of right as usurpation; and will urge, that it has
been neither conferred by Jesus Christ, nor delegated by the
people. Our Saviour expressly declares, “My kingdom
is not of this world;” and his religion was persecuted and
oppressed, during the period of its greatest purity and per-
fecion, and when the ministers of it had grins and powers
which are now unknown. The people could not delegate
such a right to any man or body of men; for the human mind
is so mutable, that no individual can fix a standard of his
own faith, much less can be commission another to estab-
lish one for him and his posterity; and this power would be in
no hands so dangerous as in those of the flateeman or priet,
who has the folly and presumption to think himself qualified
to exercise it. The use of this term was introduced at a
time, when very imperfect notions of religious liberty, and
very erroneous ideas of the authority of the civil magistrate
in the province of religion, prevailed. In its literal accept-
ation, it is without doubt objectionable, and incompatible
with just views of religious liberty. What human being,
however exalted his rank or extensive his influence, can pre-
sume to tolerate or suffer a fellow-creature to worship God
according to the dictates of his own conscience, and in that
way, or according to those rites and forms, which he ap-
prehends the object of his worship has preferred; or, in
other words, to tolerate God in receiving that worship; for
to this extreme the argument may be extended. All dif-
fabilities and penalties incurred by not worshipping God,
and performing other acts of religion, according to any merely
human ritual, are in fact prohibitions against man’s ren-
dering and God’s receiving the homage of the understanding
and the heart. Toleration, it has been said, supposes on
the part of those who exercise it an authority, to which they
have no just claim; and on the part of those who are the ob-
jects of it, a certain degree of criminality and culpability,
which the persons that exercise the right of toleration con-
decend to excuse and allow. Such are the ideas which some
modern writers have entertained on this subject; and ac-
cordingly they have witheld for a difufe of the term, as it is
found in, and leads to, error. Liberty, whether it be com-
plete, or partial, is a term well understood; and the use of it
is lefs liable to objection than that of toleration.—See on this
subject, Fownes’s Inquiry into the Principles of Toleration,
&c. 8vo. 1772. Locke’s Letters concerning Toleration,
in his Works, vol. ii. p. 231, &c. Headly’s Rights of Sub-
jects, passim. Paley’s Philosophy, vol. ii. c. 10. Per-
ville’s Essay on Truth, p. 90.

To the account above given of the general principles of
toleration, it will be proper to add a few words concerning
the state of toleration in our own country. With regard to
the Protestant-dissenters in general, see Dissenters,
Non-
conformists, and Quakers. See also Convictic
Corporation—Act, Sheriff, and Test.

As for dissenting teachers, or ministrors in particular, they
were prohibited by 17 Car. II. cap. 2. from coming within
five miles of a city, town-corporate, or borough, unless
only in passing upon the road, or unless required by legal
proceeds, without taking an oath of allegiance therein men-
tioned, on pain of 40l., and of commitment by two justices,
on oath of the offence, for six months. And by 22 Car. II.
cap. 1. preaching in any meeting or conventicle, in other
manner than according to the practice of the church of
England, incurred a forfeiture of 20l. for the first
offence, and for every other offence 40l. Moreover, by
13 & 14 Car. II. cap. 4. no perdon shall presume to confecrate
and administer the sacrament before he be ordained priest,
according to the form of the church of England, on pain of
100l. But now by 1 W. cap. 18. commonly called the
Act of Toleration, which, by 19 Geo. III. cap. 44. is
declared to be a public act, they are exempted from the
penalties of those statutes, upon taking the oath of al-
legiance and supremacy, and subseribing the declaration
against popery; and also, by 1 W. cap. 18. subseribing
the articles of religion mentioned in the flate. 13 Eliz. cap. 12.
(which only concern the confession of the Christian faith
and the doctrine of the sacraments) with an express excep-
tion of those relating to the government and powers of the
church,
TOLERATION.

church, and to infant baptism; or if they scruple subscribing the articles, upon making and subscribing the declaration prescribed by stat. 19 Geo. III. cap. 44, professing themselves to be Christians and Protestants, and that they believe the Scriptures of the Old and New Testament, as commonly received among Protestant churches, to contain the revealed will of God, and that they receive the same as the rule of their doctrine and practice; for the register of which they shall pay 6d. to the officer of the court and no more, and 6d. for a certificate thereof signed by such officer. A further enlargement of the Toleration Act, in favour of those who impugn the doctrine of the Trinity, was made by 53 Geo. III. c. 162.

Any preacher or teacher, duly qualified, shall be allowed to officiate in any congregation, although the same be not in the county where he was so qualified, provided that the place of meeting hath been duly certified and registered, and such teacher or preacher shall, if required, produce a certificate of his having so qualified himself, and before any justice of such county where he officiates, make and sub-\footnote{I.}scribe such declaration, and take such oaths as aforesaid, if required. \footnote{10 Ann. cap. 2.} And every such teacher, having taken the oaths, and subscribed as above, shall from thenceforth be exempted from serving in the militia, or on any jury, or from being appointed to bear the office of churchwarden, overseer of the poor, or any other parochial or ward office, or other office in any hundred, city, town, parish, division, or wapentake. For the state of dissenting school-masters, see School-\footnote{IV.}Master.

In consequence of the Toleration Act, non-conformity is no longer a crime in the eye of the law, and the penalties to which it was obnoxious are not only suspended, but absolutely annulled with regard to those dissenters who are qualified as the act directs. See Furneaux's Letters to Judge Blackstone, letter i. See Dissenters.

For an account of the laws relating to Papists or Catholics, see Papists. We shall here state the toleration granted to Catholics by the 31 Geo. III. c. 32. By this act it shall be lawful for persons professing the Roman Catholic religion, to appear in any of the courts at Westminster, or at the general quarter sessions for the county, city, or place where he shall reside, and there in open court, between the hours of nine in the morning and two in the afternoon, take, make, and subscribe the following declaration and oath: viz.

"I A. B. do hereby declare, that I do profess the Roman Catholic religion."

I A. B. do sincerely promise and swear, that I will be faithful and bear true allegiance to his Majesty king George the Third, and him will defend to the utmost of my power, against all conspiracies and attempts whatsoever, that shall be made against his person, crown, or dignity; and I will do my utmost endeavour to delfo and make known to his majesty, his heirs and successors, all treasons and traitorous conspiracies which may be formed against him or them: and I do faithfully promise to maintain, support, and defend, to the utmost of my power, the succession of the crown; which succession, by an act intituled, An Act for the further limitation of the crown and better security of the rights and liberties of the subject, is added and limited to the princes Sophia, electresses and duchesses dowager of Hanover, and the heirs of her body, being Protestants, hereby utterly renouncing and abjuring any obedience or allegiance unto any other person claiming or pretending a right to the crown of those realms. And I do swear, that I do reject and detest, as an unchristian and impious position, that it is lawful to murder or destroy any person or persons whatsoever, for or under pretence of their being heretics or infidels; and also that unchristian and impious principle, that faith is not to be kept with heretics or infidels. And I do further declare that it is not an article of my faith, and that I do renounce, reject, and abjure the opinion, that princes excommunicated by the pope and council, or any authority of the see of Rome, or by any authority whatsoever, may be deposed or murdered by their subjects, or any person whatsoever. And I do promise that I will not hold, maintain, or abet any such opinion, or any other opinion contrary to what is expressed in this declaration. And I do declare, that I do not believe that the pope of Rome, or any other foreign prince, prelate, state, or potentate, hath or ought to have any temporal or civil jurisdiction, power, superiority, or pre-eminence, directly or indirectly, within this realm. And I do solemnly, in the presence of God, profess, testify, and declare, that I do make this declaration, and every part thereof, in the plain and ordinary sense of the words of this oath, without any evasion, equivocation, or mental reservation whatever; and without any dispensation already granted by the pope, or any authority of the see of Rome, or any person whatever; and without thinking that I am or can be acquitted before God or man, or absolved of this declaration, or any part thereof, although the pope or any other person or authority whatsoever shall dispense with or annul the same, or declare that it was null or void."

Which said declaration and oath shall be subscribed by such person with his name at full length, if he can write, and if not, with his mark, and his name shall be written by the officer, adding his title, addition, and place of abode, which shall there remain of record; and such officer shall make, subscribe, and deliver a certificate of such declaration and oath having been duly made and taken, if demanded, for which he shall have 2s.; which certificate shall be competent evidence, unless falsified.

And such officer shall yearly, on or before the 25th of December, transmit to the privy council lists of the persons, with their titles, additions, and places of abode, who shall have made and subscribed such declaration and oath in the preceding year.

And no Roman Catholic, who shall have taken and subscribed the said oath as aforesaid, shall be convicted upon any of the acts following; viz.: 1 Eliz. c. 2. 23 Eliz. c. 1. 29 Eliz. c. 6. 35 Eliz. c. 2. 1 Jac. I. c. 4. 3 Jac. I. c. 4. 3 Jac. I. c. 5. and 7 Jac. I. c. 6. or any other statute or law of this realm; or in any ecclesiastical court, for not resorting to church, or having servants who shall not resort to church, or other place of common prayer.

And by 43 Geo. III. c. 30. Roman Catholics taking and subscribing the declaration and oath contained in the 31 Geo. III. c. 32. shall be entitled to all the benefits of the 18 Geo. III. c. 60. to every purpose as if they had taken the oath thereby prescribed.

And whereas, by 23 Eliz. c. 2. 27 Eliz. c. 2. 35 Eliz. c. 2. 2 Jac. I. c. 4. 3 Jac. I. c. 5. 3 Car. I. c. 2. 25 Car. II. c. 2. Papists are made subject to several punishments, penalties, and disabilities, it is enacted that no person who shall take and subscribe the said oath in manner aforesaid, shall be prosecuted or convicted for being a Papist, or reputed Papist, or for professing or being educated in the Popish religion, or for hearing or paying mists, or for being a priest or dean, or entering or belonging to any ecclesiastical order or community of the church of Rome, or for being present at or performing or observing any rite, ceremony, practice, or observance of the popish religion, or maintaining or asffiling others therein.

Provided always, that no place of congregation or assembly for religious worship shall be allowed, until the place of
of such meeting shall be certified to the feftions of the county or place in which the same shall be held, and be there recorded; and the clerk of the peace shall give a certificate thereof, if demanded, for which he shall have 6d. And no minister or other person shall officiate in any such place of meeting until his name and description as a priest or minister shall have been recorded at the feftions, for which shall be paid 6d. and a certificate thereof shall be granted, if demanded, for which shall be paid 2s. And no priest or minister who shall officiate in any such meeting not so recorded as aforesaid shall be deemed to be within the benefit of this act for any purpose whatever.

Provided, that if any such place of assembly shall have the doors locked, barred, or bolted, during the time of meeting, all persons who shall come to or be at such meeting shall receive no benefit from this act, notwithstanding his having taken such oath as aforesaid, but shall be liable to the same pains and penalties, as if this act had not been made.

If any Roman Catholic shall hereafter be appointed high or petty constable, churchwarden, overseer of the poor, or any other parish or ward office, and shall refuse to take upon him any of the said offices, he may execute the same by a sufficient deputy, to be approved of in like manner as other persons.

Every minister of any Roman Catholic congregation who shall take and subscribe the said oath in manner aforesaid, shall be exempt from serving on jury, and from the office of church-warden, overseer, or other parish or ward office, or any other office in any hundred of any shire, city, town, parish, division, or wapentake.

But all laws made for frequenting divine service shall continue in force, unless where persons shall come to some religious worship permitted by this act, or an act of 1 W. & M. for exempting Dissenters.

And if any person shall wilfully and on purpose maliciously and contumeliously come into any congregation or assembly of religious worship permitted by this act, and disturb the same; or misuse any priest, minister, preacher, or teacher therein, he shall, on proof by two witnesses, before one justice, find two sureties of the peace to be bound by recognizance in 50l. and in default thereof, shall be committed to prison till the next feftions, and on conviction of such offence at the feftions, shall forfeit 20l. to the king.

Provided, that no benefit herein contained shall extend to any Roman Catholic ecclesiastic permitted by this act, who shall officiate in any congregation, or assembly hereby permitted, with a fleeping and bell, or at any funeral in any church or church-yard; or who shall exercise any of the rites or ceremonies of his religion; or wear the habits of his order, fave within some place of congregation, or assembly for religious worship permitted by this act; or in any private house where shall not be more than five persons assembled besides those of the household; or who shall not previously to his so exercising his function have taken the oath of allegiance, abjuration, and declaration hereby appointed, in manner aforesaid.

But nothing herein shall exempt any Roman Catholic from paying tithes or other parochial duties, or any other duties to the church or minister; or to repeal any part of 26 Geo. II. c. 33. "for preventing clandestine marriages," or any parts of any statutes concerning marriages; or to give any safe or benefit to any person who shall, by preaching, teaching, writing, deny or gain the oath and declaration aforesaid, or the doctrines therein contained, or any of them; or to repeal or affect any law concerning the right succession to or limitation of the crown.

And no Roman Catholic, who shall take and subscribe the said oath of allegiance, abjuration, and declaration, as aforesaid, shall be profecuted for teaching youth as a tutor or school-maister; but he shall not hold any manorship of any college, or school of royal foundation, or of any other endowed college or school for the education of youth; nor shall keep a school in either of the universities; nor shall receive into his school for education the children of any Protestant father; nor shall teach any school until his name shall be entered at the feftions in manner aforesaid, as a Roman Catholic schoolmaster; and no person offending in the premisses shall receive any benefit from this act.

Provided also, that nothing herein shall make it lawful to found, endow, or establish any religious order or society of persons bound by monastic or religious vows; or any school, academy, or college by any Roman Catholic; and that all usages, trusts, and dispositions, whether of real or personal property, before deemed to be unlawful, shall continue to be so deemed.

No person shall be summoned to take the oath required by 1 W. & M. feft. 1. c. 3. or the declaration required by 25 Geo. II. c. 2. Nor shall the 1 W. & M. feft. 1. c. 9. for removing Papists from London and Westminster, extend to Roman Catholics who shall have taken and subscribed the oath, &c. herein appointed.

No peer who shall have taken and subscribed the said oath, &c. in manner aforesaid, shall be liable to be profecuted under 30 Car. II. fl. 2.

And the 1 Geo. I. feft. 2. c. 55. and 3 Geo. III. c. 18. requiring Papists to register their names and real estates are repealed; and all deeds and wills of Papists shall, after the 24th of June 1791, be good as if the said acts had never been made.

And whereas by 7 & 8 Will. c. 4. and 1 Geo. I. ft. 2. c. 13. every person acting as a counsellor at law, barrister, attorney, solicitor, clerk, or rotarian, not having taken the oaths and declaration therein prescribed, should be liable to certain penalties, it is enacted that these oaths and declarations shall be no longer required; but the oath and declaration herein appointed shall be taken in lieu thereof, in manner aforesaid.